

ELx808

Automated
Microplate
Reader

Service
Manual



ELx808 and variations

ELx808 /Automated Microplate Reader
Service Manual

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Revision		
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	Revision	Date	Changes
A		1/96	Released to Production
B		10/01	Updated the Assembly Drawings, Reformatted the Test procedure sections, Updated the format of the document to current template, and added more material to support the instrument.

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Chapter 1

General Information

Purpose and Scope

This document is a service manual. It provides the technical information for qualified service personnel to assemble and test the functionality of the ELx808 line of instrumentation, and assumes a general understanding of the Bio-Tek Instruments, Inc. ELx808 Automated Reader product line.

This manual should be used in conjunction with the “Operator's Guide for the ELx808 Automated Reader”, Bio-Tek part number **7341000**.

Certain sections of this manual contain copies of documentation that is currently in use at Bio-Tek. All documentation is subject to revision over time. Schematics are included in this manual if component-level repair is necessary. Assembly drawings are included to aid in the assembly and disassembly of the ELx808.

If you need further information, please contact the Technical Assistance Center:

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1-802-655-4044	From outside the United States, excluding Europe
33 1 39 30 2276	From within Europe

Fax:

1-802-655-3399	USA
33 1 39 30 0987	Europe

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LabTAC@BioTek.com

Abbreviations and Symbols

The following warning and informational symbols may be found in various locations on the ELx808 Reader. Only qualified personnel who recognize shock hazards and are familiar with the safety precautions should repair this instrument.



Alternating current
Courant alternatif
Dreiphasen-Wechselstrom
Corriente Alterna
Corrente alternata



Direct current
Courant continue
Gleichstrom
Corriente continua
Corrente continua



Both direct and alternating current
Courant continu et courant alternatif
Allstrom (Gleich - und Wechselstrom)
Corriente continua y corriente alterna
Corrente continua e corrente alternata



Earth ground terminal
Borne de terre
Erde (Betriebserde)
Borne de Tierra
Terra (di funzionamento)



Protective conductor terminal
Borne de terre de protection
Schutzleiteranschluss
Borne de Tierra de Protección
Terra di protezione



On (Supply)
Marche (alimentation)
Ein (Verbindung mit dem Netz)
Connectado
Chiuso



Off (Supply)
Arrest (alimentation)
Aus (Trennung vom Netz)
Desconectado
Aperto (sconnessione dalla rete di alimentazione)

**Caution (refer to accompanying documents)**

Attention (voir documents d'accompagnement)

Achtung siehe Begleitpapiere

Atención (vease los documentos incluidos)

Attenzione, consultare la doc annessa

**Caution, risk of electric shock**

Attention, risque de choc électrique

Gefährliche elektrische Spannung

Atención, riesgo de sacudida eléctrica

Alta tensione (in questo documento Alta tensione non significa “tensione pericolosa” come definito in IEC 417)

Warnings

Use the ELx808 Automated Reader on a flat surface and away from excessive humidity.

When operated in a safe environment, according to the instructions in this manual, there are no known hazards associated with the ELx808.

Hazards

Warning! Power Rating. The ELx808 Reader's power supply must be connected to a power receptacle that provides voltage and current within the specified rating for the system. Use of an incompatible power receptacle may produce electrical shock and fire hazards.

Warning! Electrical Grounding. Never use a two-prong plug adapter to connect primary power to the ELx808 power supply. Use of a two-prong adapter disconnects the utility ground, creating a severe shock hazard. Always connect the system power cord directly to a three-prong receptacle with a functional ground.

Warning! Internal Voltage. Always turn off the power switch and unplug the power cord before cleaning the reader's outer surface.

Warning! Liquids. Avoid spilling liquids on the reader; fluid seepage into internal components creates a potential shock hazard. Wipe up all spills immediately. Do not operate the instrument if internal components have been exposed to fluid.

Warning! Potential Biohazards. Some assays or specimens may pose a biohazard. Adequate safety precautions should be taken as outlined in the assay's package insert. Always wear safety glasses and appropriate protective equipment, such as chemically resistant rubber gloves and apron.

Warning! Software. The reader operator must follow the manufacturer's assay package insert when modifying software parameters and establishing reader methods, using the reader's on-board software.

Precautions

The following precautions are provided to help avoid damage to the instrument:

Caution: Service. The reader should be serviced by Bio-Tek authorized service personnel. Only qualified technical personnel should perform troubleshooting and service procedures on internal components.

Caution: Environmental Conditions. Do not expose the instrument to temperature extremes. For proper operation, ambient temperatures should remain between 15-40°C. Performance may be adversely affected if temperatures fluctuate above or below this range. Storage temperature limits are broader.

Caution: Sodium Hypochlorite. Do not expose any part of the instrument to Sodium Hypochlorite solution (bleach) for more than 30 minutes. Prolonged contact may damage the instrument surfaces. Be certain to rinse and thoroughly wipe all surfaces.

Caution: Warranty. Failure to follow preventive maintenance protocols may void the ELx808 warranty.

Warning! Data Reduction Protocol. The reader's software will flag properly defined controls when they are out of range. It will present all the data with the appropriate error flags in order for the user to determine their validity. Because there have been no limits applied to the raw absorbance data, all information exported via computer control must be analyzed completely.

Equipment Overview

There are several models in the ELx808 Reader product line. "G" refers to a Generic instrument.

PART NUMBER	DESCRIPTION
EL808	8 Channel Reader
EL808I	Reader 8ch W/Inc Reduced Sftwr
EL808IU	Reader 8ch W/Inc/Uv Rdc Sftwr
EL808RIU	8ch Rdr W/Rob Inc Uv Red Sftwr
EL808U	Reader 8ch W/Uv Reduced Sftwr
EL808UV	8 Ch Reader W/Uv Optics
ELX808	8 Channel Reader
ELX808G	8 Ch Reader Generic
ELX808GI	8 Ch Rdr W/Incbr Generic
ELX808GIU	8 Ch Rdr W/Incbr Uv Generic
ELX808GU	8 Ch Rdr W/Uv Optics Generic
ELX808I	Reader 8-Ch W/Incbr
ELX808IU	Reader 8-Ch W/Incbr Uv Optics
ELX808R	Reader 8-Ch W/Robot Interface
ELX808RI	Reader 8-Ch W/Robot Incubation
ELX808RIU	Reader 8-Ch W/Robot Incbr Uv
ELX808RU	Reader 8-Ch W/Robot Uv Optics
ELX808U	Reader 8-Ch W/Uv Optics

Electromagnetic Interference and Susceptibility

USA FCC CLASS A

Warning: Changes or modifications to this unit not expressly approved by the manufacturer could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. Like all similar equipment, this equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area could cause interference, in which case the user will be required to correct the interference at his own expense.

Canadian Department of Communications Class A

This digital apparatus does not exceed Class A limits for radio emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas du bruits radioelectriques depassant les limites applicables aux appareils numerique de la Class A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

EC EN 55011 GROUP 1, CLASS A - EC DIRECTIVE 89/336/EEC

The system has been type tested by an independent testing laboratory and found to meet the requirements of EC Directive 89/336/EEC and also VDE 0871/CISPR 11:1990 for Radiated Emissions and Line Conducted Emissions. Verification was to the limits and methods of EN 55011 and VDE 0876/0877. The device is classified as EN 55011 Group 1, Class A.

EC EN 50082-1

The system was also tested and found to meet requirements for Electrostatic Discharge Susceptibility, Radiated Susceptibility, and Conducted Susceptibility. Verification of compliance was conducted to the limits and methods of EN 50082-1:1992; IEC 801-2:1984; IEC-801-3:1984; and 801-4:1988.

Safety

This device has been type tested by an independent laboratory and found to meet the requirements of:

- **Underwriters Laboratories Standard** (UL) UL3101-1 Electrical Equipment for Laboratory Use; Part 1: General Requirements
- **Canadian Standards Association** CAN/CSA C22.2 No. 1010.1-1992 Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use, Part 1: General Requirements
- **IEC 1010-1** (1990) "Safety requirement for electrical equipment for measurement, control and laboratory use. Part 1 General requirements."
- **EC Directive 73/23/EEC**

Intended Use Statement

The *Automated Microplate Reader* is a multi-channel, automated, bench top, general purpose, Enzyme Immunoassay Analyzer which performs *in-vitro* diagnostic analyses of a variety of samples. The Performance Characteristics of the data reduction software have not been established with any laboratory diagnostic assay. The user must evaluate this software in conjunction with the specific laboratory diagnostic assay. This re-evaluation must include the establishment of new performance characteristics for the specific assay.

This system is designed for use with a variety of enzyme immunoassays. The developer of the ELISA test kit, in accordance with the test kit's procedure addresses assay protocol variations. A versatile curve fitting and statistical software program is included preloaded on every *Automated Microplate Reader*. If using *Extensions Define Protocol* software, up to 75 assay protocols and blanking patterns can be defined, stored in memory, and instantly accessed. Plate templates and formulas are automatically combined with the protocol assay setup. Data results may be displayed on the screen, printed out, sent to a mainframe, or merged with other software such as Lotus 1-2-3™.

This document is a service manual. Its purpose is to provide technical information on the assembly and function of the ELx808 line of instrumentation. It is to be used by experienced technical personnel along with the ELx808 Operators manual to aid in maintenance and trouble shooting of the ELx808 instrument. If additional information is required please contact Technical Service at one of the following numbers or mail correspondence to the listed address

Chapter 2

Theory of Operation

Principles of Operation

This section of the manual discusses the theory of operation for each sub-assembly within the ELx808 Automated Reader.

Overview

The ELx808 micro-plate reader is a multi channel reader. It reads a column of wells at a time. The reader has an internal power supply. The reader uses a Halogen lamp as the light source and can support up to six absorbance filters. The wavelength range is from 340nm to 800nm. The absorbance range is from 0.000 optical densities (OD) to 4.000 ODs. It has a one (1) percent accuracy from 0.000 – 2.500 OD. The instrument has options that include an incubated read chamber, Robotic door assembly and a barcode reader.

Hardware

Power Supplies

External Power

The ELx808 is externally powered by AC line voltage (115vac and 230vac). This is connected through a power cord to a RFI filtered power entry module that contains the power on/off switch and a selectable fuse holder. The module can be configured to accept input line voltages of 100, 120, 220, 240vac using the voltage selector card in the module. The fuses are contained in the module and are rated 1.5amps (1" x 1¼" qty. 1) at 115vac and .63amps (5mm x 20mm qty. 2) at 230vac. The fuse block is configured to use one or the other fuses (1.5amp or .63amp).

Power Input Transformer

The input voltage is stepped down for the unit power supplies. The secondary windings provide approximately 38.0 VAC buck voltage to the main PCB at J7.

Internal Power Supplies

Refer to the 7340400-SC, page 7, for reference. The ELx808 internal power supplies are all derived from the 38.0 VAC input with the exception of the real time clock battery. This is a board mounted battery (3.5v lithium coin) which should last for 10 years and is located on the Display PCB (See periodic Maintenance section 7.4 of this manual). The power input is protected with a Transorb (CR3). All voltage regulators on the main PCB are protected with internal (to the device) thermal protection circuits.

+24 volts

Developed by the rectifying diodes CR1, CR2 and filter cap C26. U12 filter provides EMI suppression. This is the voltage input used as the source for all internal supplies as well as motor drive voltage.

+5 volt Logic

A switch mode buck regulator used to create VCC for digital circuits. C27 and C28 are filter capacitors and L1 is the output choke. R17 and R18 set the output voltage. CR4 is a "catch" diode that provides a return path for the load current during the off cycle of the regulator. The output switcher provides current limiting as well as thermal shutdown under fault conditions.

V Lamp

A switch mode buck regulator used to power the lamp and the fan. U10 is the actual regulator with R11 and R13 setting the output voltage. The supply also has provisions to run at different voltages by switching in R12 via Q2. R12 will change the output voltage from 11.99VDC to 14.00VDC when the unit is in the "read" mode to make the bulb brighter. C24 and C25 are filter capacitors and L2 is the output choke. CR5 is the catch diode that provides a return path for the load current during the off cycle of the regulator. Due to the load on the regulator, a PC board mounted heat sink is utilized.

+12 Volts

This is a linear regulator (U9) that converts the 24Volts to +12 Volts. R15 and R16 set the output voltage. C22 and C23 are filter capacitors. This +12 Volt output is a source for the -12V, and +5VA(on the analog board) power supply. U9 is mounted to a heat sink bracket that is mounted on the fan housing.

-12 Volts

This power supply is a positive to negative voltage converter. This supply creates -12 Volts from the +12 Volt source. U8 is the device that has no external resistors. C21 and C93 are essential to the correct operation of this charge pump device. This supply is used as the negative supply for bipolar devices as well as the source for the - 5VA supply (on the analog board). Q3 prevents the charge pump of the device from "locking-up" during initial power-up. This voltage is supplied to the analog PCB.

+5VA

Derived on the analog board, a linear regulator (U6) that converts the +VMUX (+12V) into +5.0VA for use as the positive supply to the A/D converter (U4).

-5VA

Derived on the analog board, a linear regulator (U7) that converts the -VMUX (-12V) into -5.0VA for use as the negative supply to the A/D converter (U4).

+V

Derived on the optional incubator board, a linear regulator U6 that converts +24V to +V for the op amps on the board. R9 and R20 set the output voltage and C19 and C 25 are the filter caps.

-V

Derived on the optional incubator board, this power supply is a positive to negative voltage converter U7 that converts the +V to -V for the op amps on the board. C16 is the filter cap.

Mother Board

CPU

Refer to pages 1-2 of the 7340400-SC. The ELx808 uses a 16 bit 80C186EB (U42) microprocessor which runs at 16.0 MHZ . The clock frequency is derived from a 32.0 MHZ crystal (U40). The power on reset is provided via a solid-state device (U41). The system has a real time clock (U4 on the display board) that has an external battery (BT1 3.0 volt lithium coin on the display board).

Memory

The CPU uses a variety of memory. A block of BIG FLASH EPROM (U33,U45 16X524288 bits) is used as storage for application programs. A smaller block of QUICK FLASH EPROM (U34,U46 16X131072 bits) is used for variable assay parameter storage. A block of STATIC RAM (U35,U47 16X131072 bits) is used for program operation storage and a block of EPROM (U36,U48 16X32768 bits) is used to store the boot up program.

The Big Flash requires the instrument Basecode (Operating System) loaded via the RS232 port. This software is the reader's operating system.

The Quick Flash requires the instrument Assay Configuration Files loaded via the RS232 port. This software is the reader programs that are defined to perform the read functions. This is user modified to created individual read programs. There are fifty-five (55) definable programs. The download of these files are performed using the Extensions software or the Download Utility.

These programs must be downloaded before the instrument will operate properly.

The carrier alignment offset values (Auto-Calibration values) are stored in the BIG FLASH. These alignment offsets are determined by executing the Auto-Calibration program that is included in the ELx808 basecode. An alignment plate (BT1 part # 73302508) is required to find the offsets.

Light Measurement

Refer to the 7340402-SC analog board. The ELx808 uses 9 Hamamatsu silicon photo diodes to detect the light passing through the wells of the microplate and the various components that make up the optics path. There are eight photo-diodes for actual well measurements and one for a reference channel. The reference channel monitors the relative light intensity for fluctuations. If the light source output reduces, the system knows to increase the gain of the detection circuit. This reference channel check is performed during each well read and column read.

The analog board is laid out for 13 channels, but the ELx808 only uses channels 1-8 and 13. The current produced in the diode is transformed to a voltage by its associated op amp (TL074). The channel to be measured is selected by a 16 channel analog multiplexer U12. This voltage is amplified by a variable gain stage made up of U10 and U11. The variable gain stage is used to increase the signal level to the A/D (U4) so that most of the A/D signal range is used. This is necessary because each frequency interference filter passes a different amount of light. A precision voltage reference is used to scale the A/D (Q3&U8). The A/D (U4) is a 16 bit analog to digital converter. Data is serially sent to the main pcb via J1.

During the instrument power-on initialization, the optics system is tested. During this test, the filter wheel is positioned between filter number one and filter number two. This is to block the light and not allow light to reach the measurement chamber. The photo-diode no light current is measured for all nine (9) detectors. This **Dark Current** is the instruments base line noise of the measuring circuit. These values are stored in memory for each channel. The filter wheel is then moved to each filter measuring the full light levels. This is called the **Air** value. The gain of the measurement circuit is increased until an Air value of 55,000 is The **Air** value is subtracted from the **Dark Current** value to obtain a Delta Value. This delta value is to be between 20,000 and 45,000 the amount of light being transmitted is determined for each filter. A gain value is determined for each filter to achieve a maximum light level

Motor Drivers

Refer to page 5 of the 7340400-SC. The ELx808 has 3 identical 0.45 amp stepper motor drive circuits. All three have micro step capability (1/16 step resolution). A common 2.5 Volt (VCC) reference is shared by the driver circuits (U49). Each drive circuit has a D/A converter (U24, U25, U26) and a precision stepper motor driver (U15,U16,U17). The motor driver chips all have internal oscillators with external components for setting the frequency (R33 and C52 for example). Current through the each motor winding is controlled by sensing the voltage across the 1 ohm sense resistor (R28 for example) and comparing that voltage to the reference voltage output by the D/A converter. When the voltages are the same, the current to the winding is shutoff by a comparator internal to the motor driver IC.

Output Ports

Refer to pages 3 and 4 of the 7340400-SC. The ELx808 has a twenty-five (25) pin Serial port and a twenty-five (25) pin parallel port located on the rear panel of the instrument. The serial port is a DTE configuration. The parallel port is a socket-female D-sub connector. The following pin definitions apply:

Serial Port				Parallel Port			
Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	19	NC	1	PSTROBE	19	GND
2	TX	20	DTR	2	D0	20	GND
3	RX	21	NC	3	D1	21	GND
4	RTS	22	NC	4	D2	22	GND
5	CTS	23	NC	5	D3	23	GND
6	DSR	24	NC	6	D4	24	GND
7	GND	25	NC	7	D5	25	GND
8	DCD			8	D6		
9	NC			9	D7		
10	NC			10	NC		
11	NC			11	BUSY		
12	NC			12	NC		
13	NC			13	ON-LINE		
14	NC			14	NC		
15	NC			15	NC		
16	NC			16	RESET		
17	NC			17	NC		
18	NC			18	GND		

BioTek # 75053 is a DB9F to DB25F serial cable

BioTek # 75049 is a DB25M to Centronix parallel cable

Motors

X-Axis (Track Carrier Motor)

The X-axis motor moves the track carrier left to right. The carrier homes to an optical sensor mounted on the track. Drive motion is transmitted via a toothed belt attached to the track carrier. The belt is automatically tensioned and requires no adjustment.

Y-Axis (Filter Wheel Motor)

The Filter Wheel motor moves the filter wheel. The filter wheel is homed using an optical sensor and the cutout on the filter wheel. The filter wheel motor is mounted at the front cavity of the base frame. Drive motion is transmitted directly from the motor shaft to the filter wheel. The filter positioning is determined by finding the home position. The filter wheel is then moved to a fixed number of motor steps determined by design.

Robotic Track Lid Lift Motor (Optional)

This motor lifts the door and inner track cover when the reader is interfaced with a robot. The motor turns an inner brass nut that moves a leadscrew in and out. The leadscrew position is homed by a flag that blocks an optical sensor mounted to the lid lift motor mounting bracket. The door position can be adjusted using the on board software. The motor moves from the home position to the user programmed number of steps.

Display & Keyboard

Refer to 7340401-SC display board. The ELx808 uses a board mounted 2X24 character LCD display. The contrast of the display can be varied via RT1 on the display board. The keypad is shielded with a conductive layer under the graphics layer. This shield has a separate conductive adhesive backed tab that is attached to the inside of the base frame of the unit. This shield is for electrostatic discharge (ESD) protection.

The keypad is a membrane type non-tactile switch matrix. The software continuously polls the keypad for key presses. When a key is pressed, it shorts the signal to ground that is interfaced to a multiplexer. The processor polls the multiplexer and determines which key was pressed by the bit pattern received.

Optics

The ELx808 uses eight optic channels for measurement. The light passes through the fiber optic bundle, a lower convex lens, the microplate, and the upper concave lenses and detected by the photo-detectors. The reference channel is routed directly to the analog board bypassing the lower and upper lens blocks via the fiber optics.

The light from the bulb is focused by a plano-convex lens and passed through a piece of IR absorbing glass (schott KG1) mounted in the lamp assembly. The light beam passes through a selectable interference filter mounted in the filter wheel.

Light passes through the interference filter then through the fiber optics bundle. The light is split into the nine separate channels. At the end of the bundle is a block that orients the eight-measurement fiber ends in a pattern that coincides with the microplate. A photo mask with precision oval holes is mounted against the optics block and cuts the eight beams of light into ovals. The light then passes through the lower lens block that focuses the beams. The light passes through the wells, in the microplate,

up to the upper lens block where the beams are re-focused. The light beams then reach the photo diodes on the analog board. The photo diode produces a current that is proportional to the amount of light striking it. This current is measured by the analog front end circuit on the analog board. This measurement is then serially sent to the main board.

The ninth channel is used as a reference to monitor the lamp light intensity during the well reads. If the light intensity fluctuates, the software adjusts the photo-detector circuit gain accordingly to maintain a proper resolution. The light from this channel takes a direct path from the fiber to the photo-detector. There is no focusing lens used. The light is diffused. It does not need to be focused since only the intensity changes are monitored.

Lamp

The lamp is a halogen bulb. The lamp voltage idles at about 11.95 volts and during a read is switched to 14.0 volts. This provides more light from the bulb during the read cycle and keeps the bulb in the halogen cycle while it is waiting between reads. The lamp and filter wheel area is cooled by a 12 Volt DC, 3.13 inch, 31.8cfm fan. **The fan must be on whenever the lamp is on or damage to the primary optics components may result.**

Interference Filters

The ELx808 uses interference filters to select the desired frequency of light. These filters are mounted in the motor driven filter wheel. A maximum of 6 filters can be installed at one time. All unused filter locations must carry blank filters or errors will result.

The standard ELx808 instrument can use filters from 400 to 750 nm, 340 to 750nm (ELX808UV). Order # 3100XXX where the XXX is the pass frequency in nanometers. These filters typically last about 5-6 years.

Track Assembly

The track is the assembly which holds the microplate to be read. It is presented to the user under the track lid at power up. Micro plates are held in place with use of 2 plate retention springs. The track assembly is factory aligned. The plate carrier in the track homes under the track lid using a homing tab. This tab interrupts an opto sensor when the carrier is moved home. The carrier is stepper motor driven and is connected via a drive belt and self tension adjusting pulley.

Incubated Track Assembly (Optional)

The incubated track assembly is the same as the track mentioned above with the exception that it is incubated. The track is split into 4 heating zones. Each has its own 24VDC 8watt heater pad and thermistor used for sensing the heat in that zone. The heaters are controlled by the incubator board. A thermostat switch is attached to the track in the event of an incubation control problem. The thermostat will open and disable the 24VDC from the heaters if the track temperature exceeds 60°C. The incubated track is covered with 1/4" insulation foam.

Incubator Board (Optional)

Refer to 7340403-SC. The incubator board provides 24 VDC to the track heaters. The incubator board is controlled by the main board. The main board and software decide when and what heater zone to turn on using feedback from the incubator board. This is done by monitoring each zones temperature and compensating for the difference between the temperature set point and the actual zone temperature. The zone temp is measured using thermistors attached to each track heater zone. These thermistors act to control the gain of the op amps (U2). The outputs of the op amps are sent to an 8 channel analog multiplexer (U4). The address lines which select a zone measurement come from the main board and

are present at U4. This device selects a zone to be measured and this value is sent to the A/D converter (U5) and the digital value is serially sent to the main board. Heater control lines from the main board are present at U8. When the control signal is high, the output of U8 goes low, turning on a segment of bar led U13 (visual indication that the zone is on). The low signal also turns on opto isolators S1-S4 which turns on fets Q1-Q4 routing 24VDC to the heaters. The thermostat which disables the 24VDC to the heaters in an over temp condition is connected to J3.

FMEA (Self Test)

Noise test

The noise test is simply to determine if the front end read channels have a noise component greater than that which would yield readings within the specified accuracy limits. To perform this test we take four individual reading packets of 96 reads per packet at the dark read filter location. We take 96 reads because that's the minimum number of readings taken and averaged for all reads. After the 4 reading packets are taken we compare the average value of each packet to the others to determine the consistency of the readings. The consistency is a measure of the system noise that would affect reading accuracy.

For the ELx808 reader we perform a noise test for every plate read and the test consists of taking the 4 packet readings spaced 100ms apart, with the gain set to max (36.6). This adds around 420ms to the reading. For the 808 reader this algorithm presents a problem since there are 8 channels to test and it would add too much time the plate read (3.4 sec). Therefore for the 808 reader we will perform the normal noise test at max gain, as described above, on power up and when the self test feature is selected. For normal dynamic operation we will incorporate a modified noise test into the already present dark read. The test will use the Max Gain and take 3 packets of 96 reads per packet in the dark read filter location. This dark read operation will be performed for each channel and each read packet will be spaced apart by 10ms. These 3 readings will be compared to each other and the highest and lowest values must be within 20 counts of each other. This is the same limit that is applied to the normal noise test required to satisfy the system reliability and FMEA requirements.

Air and Dark reads

To satisfy manufacturing and FMEA tests, we must apply allowable limits for air read gain settings and dark read values. The air reading limits will guarantee proper bulb intensity and system gain operation. The dark read test will guarantee proper noise margins and programmed hardware offset value. The FMEA tests will be performed routinely during operation and report errors when the limits are exceeded. The manufacturing tests will be similar to the FMEA tests but have derated limits to insure field reliability margins.

To perform the FMEA tests the software will compare the aforementioned measurements to stored downloadable limits and report errors to the user when appropriate. The tests limits must be downloadable so as to allow for design modifications based on performance variations over the life of the product. The manufacturing test will require that the measured values be printed or displayed allowing them to be compared to limits listed on a manufacturing test procedure. The values that we will be testing will be A/D output in counts and encoded gain values output to the programmable gain amp (PGA). The A/D output range is straight forward where as 0 input will give 0 counts and full-scale input will give 65536 counts. The PGA values for each filter are encoded in the software meaning that these values are not the absolute gains of the amplifier, and since all my calculations and limits were based on absolute gains I will transform them into the encoded values using the following formula:

$$\text{Encoded value} = 255 - (256/\text{abs\_Gain})$$

The optics tests along with the FMEA and manufacturing test limits are as follows:

Dark Read Tests

There are two tests that must be performed for dark read verification namely noise and offset. These tests will only have to be performed periodically, and it is recommended that it is done during power up. For these tests it is required that the gain be set at the max allowed value of 36.6 (encoded value of 248) and with the filter in the dark read position, except for the dynamic test where the gain has the value determined by the selected filter.

The first test will be a noise limit and will be performed by checking the repeatability of 4 individual dark reading packets (96 readings/packet). Each packet contains 96 readings and the 4 packet measurements are spaced 100ms apart. For the dynamic test performed during operation we will compare 3 packets spaced 10ms apart to reduce the plate read time while still providing repeatability checks.

The second will be a front end offset test to verify that the programmed front end offset is within the specified range for each channel. The Limits are as follows:

FMEA noise test Limits: 20 count repeatability for 4 packets (3 packets dynamic)

FMEA offset test Limits: between 10 and 10,000 counts

Manufacturing noise test Limits: 12 counts repeatability for 4 packets (3 packets)

Manufacturing offset test Limits: between 20 and 9500 counts

Air Read Test

The air read test will verify that the gain settings for each filter are within the specified range. This test will be performed every time the filter gains are set and compared against the FMEA gain limits. The filter gains will be stored, and must be able to be printed or displayed so they can be compared against the manufacturing limits. The Limits are as follows:

Filters 405 - 720nm

FMEA Filter Gain Limits: 1.4 to 36.6 (82 to 248 for software encoded values)

Manufacturing Filter Gain Limits: 1.4 to 23.3 (82 to 244 for software encoded values)

FMEA (AIR Read - DARK Read) Limits: 20000 - 60000 Counts

Manufacturing (AIR Read - DARK Read) Limits: 30000 - 60000 Counts

340nm Filter

FMEA Filter Gain Limits: 1 to 128 (0 to 253 for software encoded values)

Manufacturing Filter Gain Limits: 1.5 to 85.3 (85 to 252 for software encoded values)

FMEA (AIR Read - DARK Read) Limits: 8000 - 60000 Counts

Manufacturing (AIR Read - DARK Read) Limits: 20000 - 60000 Counts

Reference Channel

FMEA (AIR Read - DARK Read) Limits: 1000 - 60000

Reference Readings taken before each Row at read time must be within 50% of initial reference channel reading.

Chapter 3

Decontamination

See the operations manual for specific instructions on how to decontaminate the ELx808 instrument.

Scheduled Maintenance

Annual Preventive Maintenance Procedure

The following guidelines can be used to clean the ELx808 instrument on a yearly basis. **The instrument should be turned off and unplugged before cleaning.**

Exterior Surfaces: All exterior surfaces can be wiped down with a moist cloth. use a mild detergent/water solution.

Interior Surfaces: With the top shroud and track lid open, the track carrier and any exposed area of the base pan can be wiped down with a moist cloth. Use a mild detergent/water solution.

Track Carrier Rail:

This can be cleaned with 70% isopropyl alcohol on a cloth. This will remove any residue that may have built up over time. **Do not lubricate the rail.** The bearing material is self-lubricating. Adding a lubricant would likely attract dirt and lower the rail and bearing life.

To access the track carrier rail;

- 1) Remove the lower Base plate of the ELx808. Remove the seven screws holding the top cover. Open the top cover
- 2) Remove the analog PCB that is mounted to the upper lens block. Use ESD pre-cautions
- 3) Remove the analog PCB support bracket
- 4) Remove the upper lens block. (There are two black positioning spacers used to position the analog PCB to the lens block. Do not lose these.)
- 5) Remove the reference channel fiber from the upper lens block assembly.
- 6) Located on the side of the track assembly, remove the four (4) nylon screws clamping the track top cover to the base. Remove the clear plastic clamps.
- 7) Lift the track assembly top cover and lift it back towards the main PCB. This should now expose the rail and carrier.
- 8) Remove the carrier belt from the idler pulley by pushing the pulley inward. This pulley is spring loaded.
- 9) Remove the carrier rail by loosening the two shoulder screws on each end of the rail. Do not lose the two compression washers.
- 10) Slide the rail out of the carrier nylon bushings.
- 11) Clean the rail and nylon bushings. (If the inner part of the nylon bushings are discolored or scratched, replace the bushings.) Slide the rail back into the carrier bushings. Inspect the carrier belt for cracking or wear. Re-install the carrier belt on the motor pulley and the idler pulley.
- 12) Re-install the rail to the track assembly using the shoulder screws and the two compression washers. Verify the carrier can move freely
- 13) Re-install the track assembly cover. The back of the cover mounts to the back of the track assembly using two guide pins. Make sure the guide pins hold the cover in place.

- 14) Re-install the clear plastic clamps and the four nylon screws.
(Do not re-install the Upper Lens Block and the Analog PCB at this time.)

Lower Lens Assembly:

The lower Lens assembly needs to be removed to clean the eight concave lenses that are housed in this assembly.

15. Remove the four screws that mount the track assembly to the base of the instrument. The four screws are accessed from under the base.
(Incubated version ELx808s uses a rubber washer with each screw to allow for heat expansion. Remember to keep this washer with the screws.)
16. Lift and flip back the track assembly towards the main PCB. Let it rest on the PCB assembly.
17. The Lower Lens assembly should now be exposed. Remove the four Philips head screws that hold the cover to the lens assembly. This will expose four inner Philips head screws.
18. Place your hand under the base and hold on to the fiber bundle. Remove the four inner screws of the lens assembly. The fiber bundle will want to drop. Guide the fiber bundle slowly to the table.
19. Remove the Lower Lens and turn it over. Using a small flat head screwdriver, remove the top cover. This will expose the concave lenses.
Caution: Note the positions and orientation of the lenses. Refer to the assembly drawing number [7340529-AS page 1 of 2](#) for proper lens orientation)
20. Clean each lens with a lens paper and isopropyl alcohol. Remove one lens at a time to prevent positioning errors.
21. When all the lenses have been cleaned and placed back into the lens holder, replace the top cover. This cover will only fit correctly in one orientation.
22. Re-install the Lower Lens assembly to the base. You will need to mount the fiber bundle to the Lower Lens assembly using the four screws.
23. Install the top cover to the Lens assembly and mount it using the four Philip head screws.
24. Re-install the Track assembly using the four screws (with the rubber isolator washers if an incubated version). Do not tighten the screws at this time.
25. Looking down on the track assembly, locate the eight optic holes and position the track assembly to align the holes to the eight holes on the lower lens assembly. The lens assembly holes should be centered to the track assembly holes. Once aligned, tighten the four mounting screws.

Upper Lens Block:

The upper lens block consists of eight quartz convex lenses that need to be cleaned. The procedure for cleaning is as follows:

26. Remove the four screws that are holding the lens retaining cover on the upper Lens assembly.
27. Remove the rubber casket and remove, a lens at a time, the quartz lens and clean the lens with lens paper and isopropyl alcohol. Place the lens back into the block.
28. Re-install the rubber gasket and the lens retaining cover.
29. Re-install the upper lens block to the track assembly. Insert the reference channel fiber into the block before seating the block on to the two standoffs. This fiber must be fully seated into the block.

30. Using the two hex head screws, mount the upper lens block to the two standoffs.
31. Re-install the Analog PCB support bar. Do not tighten the screws.

Optics Path Check:

Now that the optic lenses and track assembly has been re-installed, A check of the optics path is required.

32. Remove the filter wheel from the instrument and place it to the side paying attention to not scratch the filters.
33. Apply power to the instrument and let the instrument perform the initialization. The initialization will fail. Press the **MAIN MENU** key to cancel the error.
34. Open the top cover and you will notice full light passing through the Upper Lens Block. Using a piece of white paper, place the paper over the Upper Lens Block and verify the light in each channel is at the same intensity and the opening is elliptical in shape. (The reference channel will appear more diffused due to not having the focusing lens.)
35. Remove the power to the instrument.
36. Inspect the Analog PCB photo-diodes for cleanliness.
37. Re-install the analog PCB by placing the two black spacers and the foam isolator pad on the upper lens block. Place the analog PCB on the spacers. The photo-detectors should fit into the holes in the foam pad. Screw the PCB to the support bar and the upper lens block.
38. Tighten the screws to the analog PCB support bar.

Filter Wheel:

39. Before re-installing the Filter Wheel, The interference filters should be cleaned with lens paper and 99% Isopropyl alcohol. Be aware of the filter position and orientation and be sure to replace the filter in the same position it was in before it was cleaned. **If the positions are changed, the instrument will use the incorrect filter the next time it is used. A filter table is defined in the software to determine what filter is in what location.**
40. Before closing the top shroud, inspect the ribbon cables on the main PCB to ensure the movement of the top shroud did not pull them out. Close the top shroud. Install the 7 black slotted screws to the base that holds the top shroud down.
41. End of the Cleaning Procedure. Proceed to the [Service Procedures](#).

Chapter 5

Corrective Maintenance

Lamp Replacement

The lamp life is rated at an average of 500-600 hours. The intensity of the lamp will slowly drop over time until the *run time self check* detects a low signal level and flags the user on the display.

The bulb should be replaced at this time, using a replacement bulb part numbered BTI# 3400508. **Figure 7-1** for a detailed view of access to the lamp assembly.

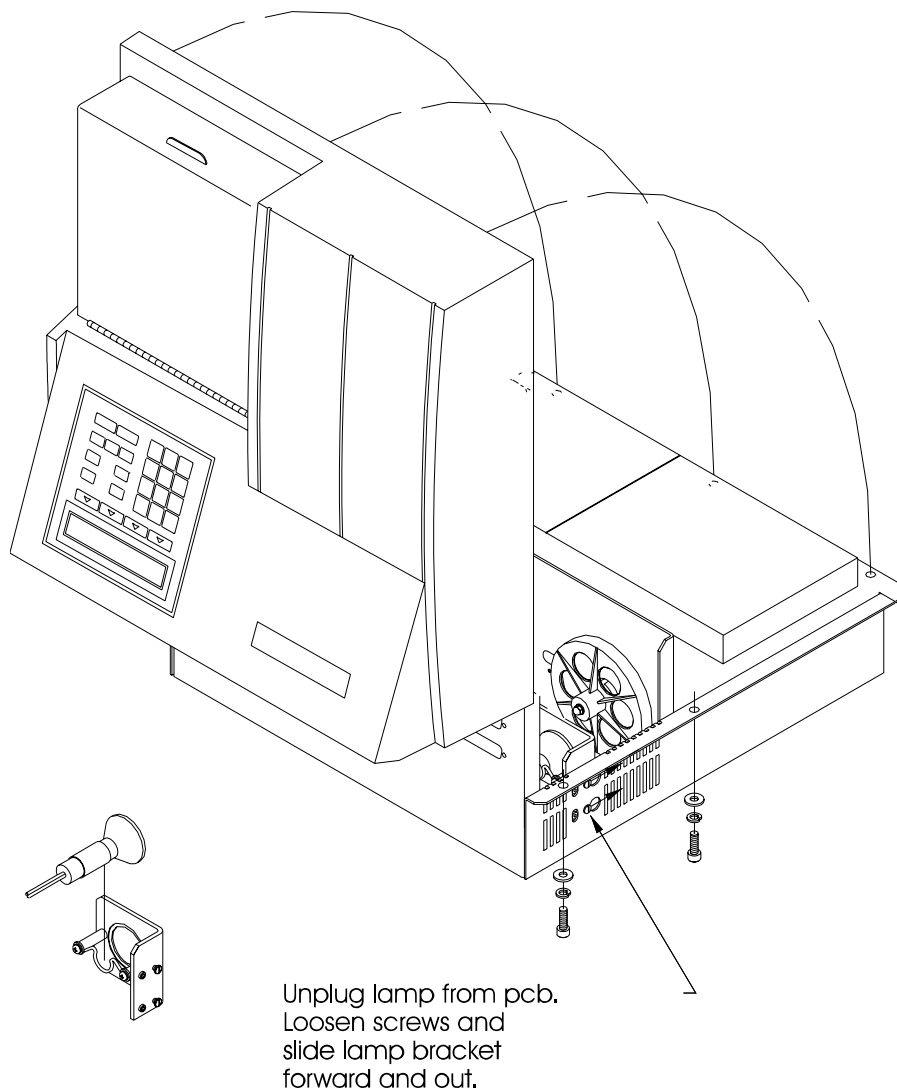


Figure 5.1: Location of the lamp assembly

To replace the lamp:

WARNING: *The lamp will be hot immediately after the unit has been shut down. Allow at least 10 minutes cool down time before attempting to replace the bulb.*

- Unplug the instrument and remove the seven perimeter slotted black screws from the front, left and right sides of the instrument.
- Lift the top shroud up to expose the interior of the instrument. The lamp is located in the rear left corner of the instrument. Unplug the lamp connector from the main circuit board.
- Loosen the two Flat head screws that retain the lamp assembly. They are located on the left side of the instrument and are accessed from the outside of the instrument.
- Slide the lamp assembly forward and pull it in to the interior of the instrument, then lift it out. The lamp is held in place by a spring. To remove it from the assembly pull on the back of the bulb and rotate the bulb toward the opening in the retention spring.
- Remove the lamp socket by pushing the socket and the bulb together and rotating counter clockwise, then separating the bulb from the socket.
- Before installing the new bulb, clean the lamp contacts with a metal contact cleaner or a pencil eraser.
- To Install the lamp, reverse the above steps. Keep your fingers out of the reflector interior and off of the bulb. Make sure the bulb is sitting flat in the assembly before reinstallation in the instrument.

Real time clock battery replacement

The ELx808 has a 3.0v lithium battery that powers the real time clock circuit. In the event that the instrument fails to keep accurate time and date, the real time clock battery should be replaced. Follow the below instructions to gain access to the battery. Only perform this if the batter

1. Lift the top shroud all the way back and carefully allow it to stop on the hinge. This will expose the display board located in the top shroud. The battery is along the front edge of the board. Use a small screwdriver to pry it out of the battery holder. Replace the battery with a new one (BTI #47049, or Renata #CR2450N 3.0v lithium Coin). Mark the battery with the date installed so that battery age can be determined at a later date.
2. Before closing the top shroud, inspect the ribbon cables on the main PCB to ensure the movement of the top shroud did not pull them out. Close the top shroud. Install the 7 black slotted screws to the base that holds the top shroud down.
3. The instrument should keep time correctly once the time has been set (see operators manual). If this is not the case another problem exists with the Display board.

Chapter 6

Installation

This chapter includes instructions for unpacking and setting up the Automated Microplate and instructions for connecting printers and/or serial devices.

The Operating Environment

The *Automated Microplate Reader* is designed to operate optimally when installed on a level surface in an area where ambient temperatures remain between 15°C (59°F) and 40°C (104°F). The reader is sensitive to extreme environmental conditions, and these conditions should be avoided.

- **Excessive humidity:** Condensation directly on the sensitive electronic circuits can cause the instrument to fail internal self-checks.
- **Excessive ambient light:** This may affect the instrument's readings. Bright sunlight or strong incandescent light can reduce the linear performance range of the instrument.
- **Dust:** Optical density readings may be affected by extraneous particles (such as dust) in the microplate wells. A clean work area is necessary to ensure accurate readings.

Unpacking and Repackaging the Instrument

Unpacking

- If the shipping box has been damaged, inspect the instrument for visible dents and scratches as you unpack it.
- If the reader is damaged, notify the carrier and your manufacturer's representative. Keep the shipping cartons and the packing material for the carrier's inspection. The manufacturer will arrange for the repair or replacement of your instrument immediately, before the shipping-related claim is settled.
- If the reader is shipped to the factory for repair or replacement, it must be carefully repackaged using the original packing materials. If the original packing materials have been damaged, contact the manufacturer for replacement materials. Shipping with improper packaging materials may void your warranty. An RMA must be obtained before returning any equipment for service. Contact Bio-Tek technical service for a return material authorization (RMA) number. This number should be marked on the outside of the shipping container.

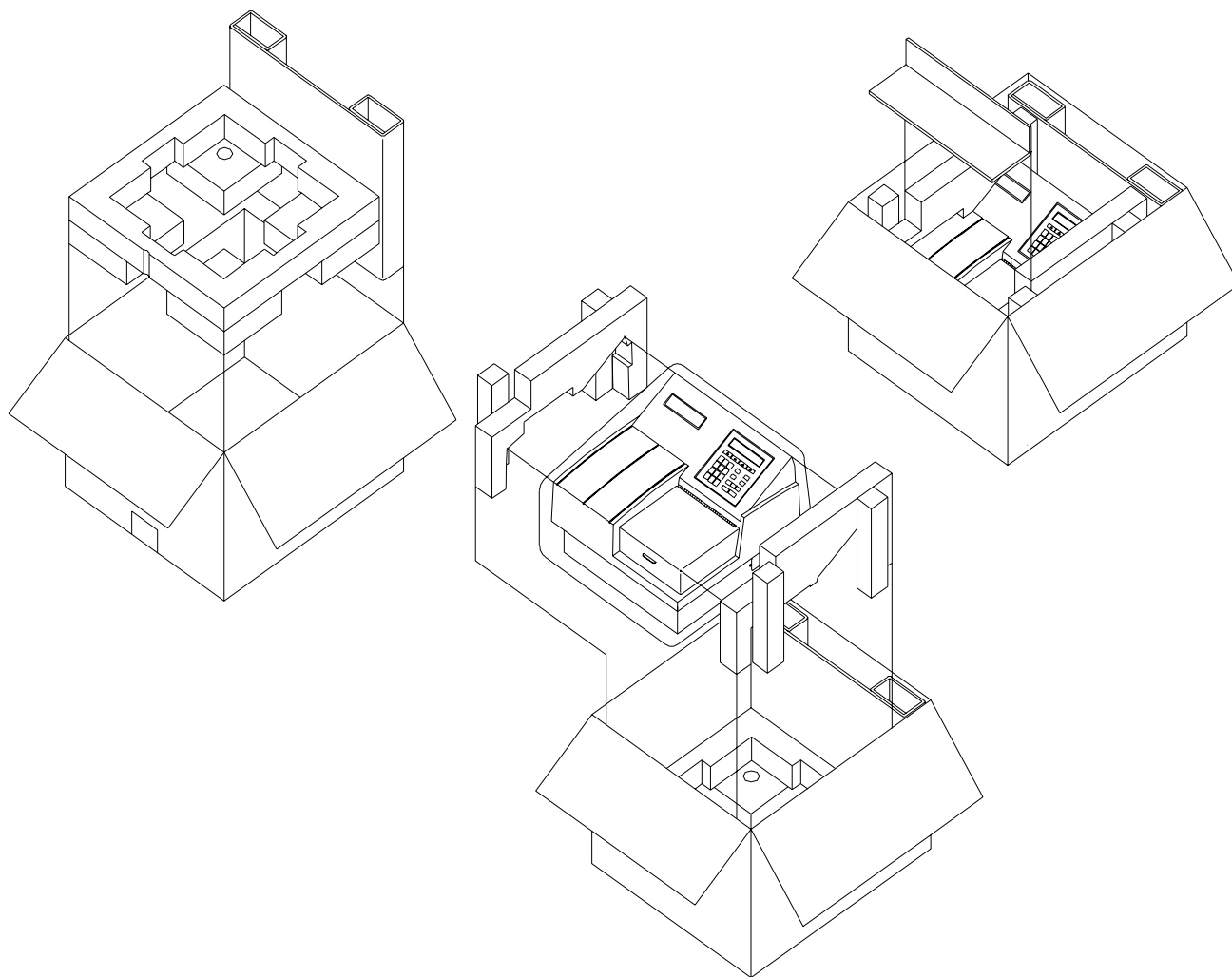


Figure 1: Shipping configuration

- Carefully open the top of the box, and remove any accessories. These will include a line power cord, a filter wheel in a padded envelope, a users guide and optionally a service manual.
- Pull end caps out.
- Lift the reader out of the box. Place the reader on a level surface and remove the instrument from the plastic bag.
- Remove the filter wheel from the shipping envelope
- Place all shipping material back into the shipping box and save the whole set for later use if the instrument needs to be shipped again. Do not ship the instrument in anything but the stock-shipping container or the instrument warranty may be voided.

Installing the filter wheel or adding additional filters

Installed in the six- position, filter wheel are the filters that come standard with the *Automated Microplate Reader* (Standard models have 405, 450, 490, 630 nm filters; the UV model's filter set is 405, 450, 490, 630 and 340 nm). The filter wheel will come packaged in a shipping envelope and must be installed prior to instrument use. If you wish to install additional filters, or change the filter locations use the following instructions to gain access to the filter wheel.

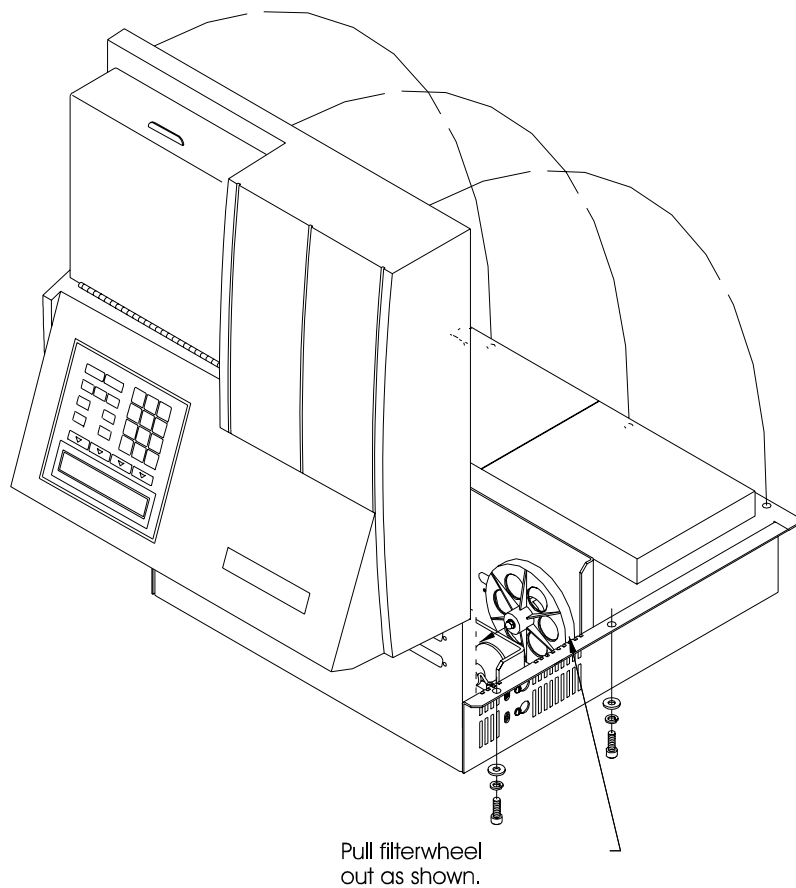


Figure 2: Filter Wheel location

- Turn off the unit and disconnect the power cord if the instrument is on or plugged in.
- Remove the seven-slotted black perimeter top shroud hold down screws.
- Carefully lift the top shroud up from the front. The top shroud will hinge along its back edge. The plate access cover will release the track door as the shroud lifts.
- The filter wheel is located in the rear left corner of the interior of the instrument. The filter wheel has a magnet that retains the wheel on the filter wheel motor hub.
- To remove the filter wheel grasp the center hub of the filter wheel and pull it back toward the lamp. The wheel should come off easily and then be lifted out of the instrument.
- The filter locations on the wheel must match those in the instruments nonvolatile memory or the assay that is run may not use the correct filter. Rearrange the filters as needed and record the new orientation on a piece of paper. All locations must have a filter or a blank plug installed for the instrument to function correctly.

NOTE: Store unused filters in a cool dry place away from direct sunlight. The filters can be wrapped in a piece of lens paper to protect them from scratches and dust accumulation.

- Reinstall the wheel on the filter wheel motor hub. Take note of the registration notch on the hub and the peg on the filter wheel. These must engage for the filter wheel to install properly. The filter wheel should sit flat and rotate without hitting anything.
- Lower the top shroud back into position. As the shroud comes down it will engage the track door. Once the shroud is down lift the plate access door and make sure that the track door opens with it.

- Reinstall the seven perimeter top shroud screws. These screws are important for two reasons:
 1. They are essential for shipping the instrument.
 2. They increase the instruments ability to withstand Electro Static Discharges and other EMI interference because the top shroud is an integral part of the instruments shielded case. Securing the top shroud and the bottom shroud improves the ground connection between the two parts of the instruments case.

After Unpacking, Verify Performance

Prior to using the instrument for the first time, verify that the instrument is operating properly and that no damage occurred during shipping by running the Calibration Validation and Verification of Alignment tests. These tests are described in **Chapter 8**.

Repackaging the Instrument

- Decontaminate the reader prior to shipping. (Refer to the Decontamination procedure in 7.3)
- Once the instrument is clean, reuse the original shipping box, using original packing materials. This shipping system was designed to be used no more than 5 times. If the container is damaged and/or has been used more than 5 times contact the original vendor for a new set of shipping materials.

Installing the Barcode Option

See the following pages:

Short Form Instructions

BIO-TEK INSTRUMENTS, INC. BARCODE OPTION INSTALLATION INSTRUCTIONS

PART NUMBER 7340014

THIS KIT CONTAINS:

Qty	Description	Part No.
(1)	Pan Head Screw 4-40 x 7/8 Phill	12051
(1)	Lockwasher #6	16003
(2)	Lockwasher #8	16016
(2)	Flat Washer .188ID x .438OD x .049	17054
(1)	Flat Washer .156ID x .375OD x .049	17055
(2)	Set Screw 4-40 x .25	19080
(2)	Socket Head Cap Screw 8-32 x 3/8	19107
(2)	Pan Head Screw 4-40 x 1/4 Phill	19187
(1)	IC LT1080 RS232 Dru/Receiver (U3)	25114
(1)	MOSFET N-CH 70 AMP	27016
(1)	IC PVI1050 Isolator Micro Elec (U2)	28072
(1)	Resistor 1.00M Ohm 1% 1/4W (R3)	32039
(1)	Resistor 200.00 Ohm 1% 1/4W (R4)	32232
(1)	Tie Wrap	42058
(1)	Header 4-Pin .100 PCB Mount (J3)	42319
(1)	Scanner Decoder Board	7123012
(1)	Cable Barcode Interconnect Asby (Cable S)	7340528
(1)	Bracket Bar Code Scanner	7342012
(1)	Capacitor 10 uF 25V Tant (C2)	82003
(5)	Capacitor 1 uF 35V Tant (C1, C10 - C13)	82005
(1)	Scanner Machine Mount	97120
(1)	Barcode Kit Test Procedure	7341006
(1)	Barcode Option Installation Instructions	7341007
(1)	Mount Cable Tie Adhesive	49095

YOU WILL NEED:

- (1) Slotted Screwdriver
- (1) Phillips Screwdriver
- (2) Allen Wrenches 3/32", 9/64",
- (1) Wrench 1/4"
- (1) Soldering Iron and Solder
- (A/R) Loctite #405

INSTALLATION PROCEDURE:

1. Using an appropriate size slotted screwdriver, remove the seven slotted screws, which hold the instrument cover to the base ban. Set the screws aside. Grasp the cover from the front of the instrument and flip the cover up. (See Figure 1)
2. For instruments with insulated tracks, cut an area (1.13" x 1.50") of the track insulation foam as shown in Figure 1.

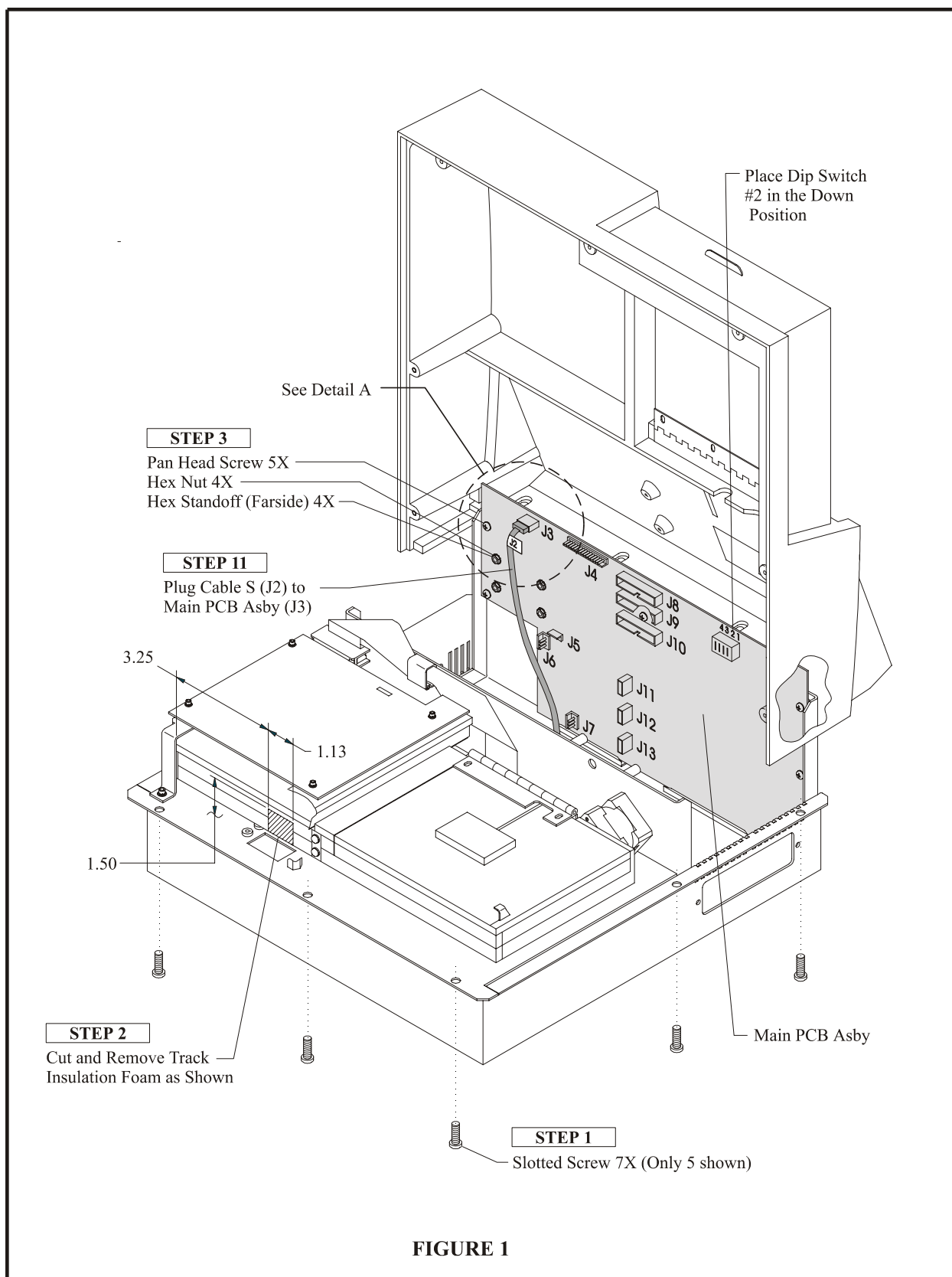


BIO-TEK INSTRUMENTS, INC.

HIGHLAND PARK, BOX 998, WINOOSKI, VERMONT 05404-0988

PHONE: 1-800-451-5172 TELEX: 94-0136 BIO TEK SHVT FAX: 802-655-7941

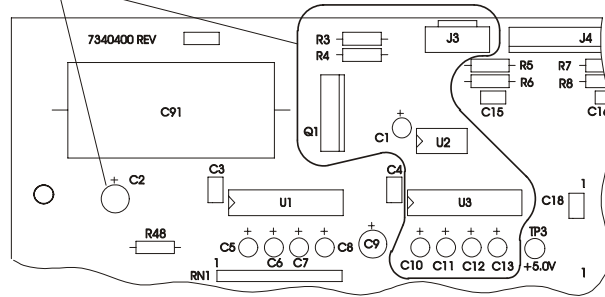
Install Instructions Barcode Option (Page 1 of 4)



Install Instructions Barcode Option (Page 2 of 4)

3. Unplug all cables to the Main PCB Asby (J4 thru J13). Remove Main PCB Asby mounting hardware: pan head screws 5X, hex nuts 4X, and hex standoffs 4X. Carefully remove the Main PCB Asby from the unit. Solder components onto PCB per parts list. See Detail A. Reinstall Main PCB Asby and connect all wires unplugged. (J4 thru J13).

Components to be added



DETAIL A

4. Assemble scanner to bracket.
 - Loosely screw scanner (97120) to scanner bracket (7342012) with pan head screw (12051) and washers (16003 & 17055).
 - Install set screws (19080) 2x and lightly tighten. Use Loctite #405 on set screws.
 - Scanner should be flat against left side of bracket (shaded area) as shown. Do not over tighten.
 - Tighten pan head screw (12051).

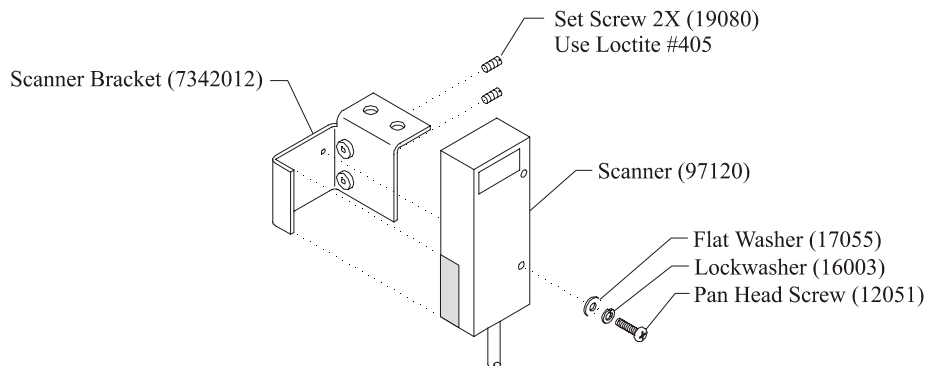
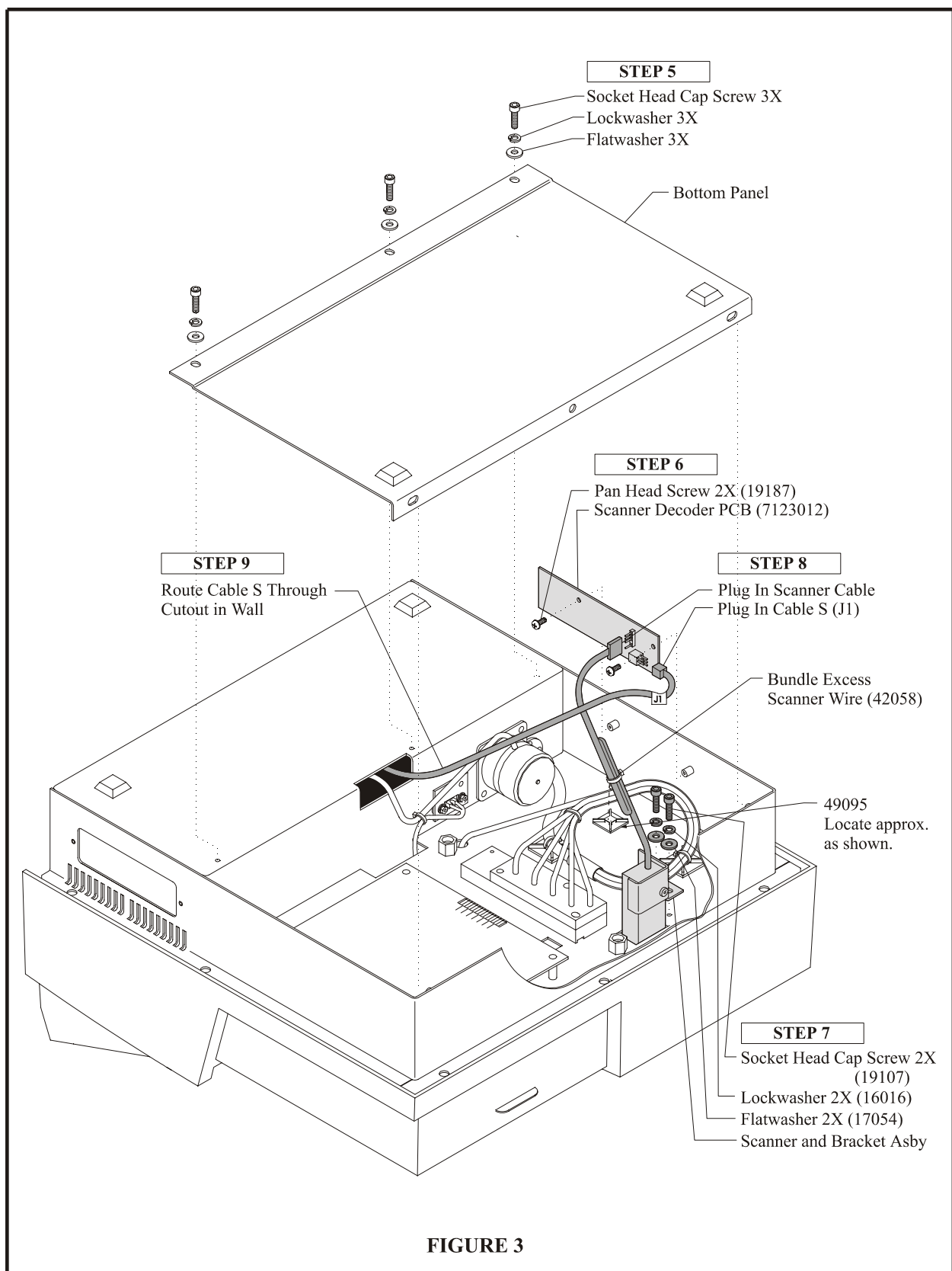


FIGURE 2

5. Close the cover, carefully turn unit over and remove the bottom panel.
6. Install the Scanner Decoder PCB (7123012) using pan head screws (19187) 2X.
7. Install the scanner with bracket assembled in step 4 using socket head cap screws (19107) 2X and washers (16016 & 17054) 2X.
8. Plug scanner cable and Cable S (J1) to Scanner Decoder PCB (7123012) as shown.
9. Route Cable S (J2) through cutout in wall. Bundle excess scanner cable with tie wrap (42058).
10. Reinstall the bottom panel removed in step 5 and carefully turn unit over.
11. Plug Cable S (J2) to Main PCB Asby (J3).
12. Close the cover and reinstall cover hardware removed in step 1.

Install Instructions Barcode Option (Page 3 of 4)



Install Instructions Barcode Option (Page 4 of 4)

Chapter 7

Error Codes

Error Codes

The following is a list of displayed error codes and what they mean. The error code is displayed as the last four digits. The instrument will still respond to keypad input to stop the beeper and return to the main menu in most cases. In cases where there are several elements such as filters or motors the right most digit will identify the element in error.

filter 1=1	motor 0 = X axis (track carrier)
filter 2=2	motor 1 = Y axis (filter wheel)
filter 3=3	motor 2 = Z axis (robot lid lift)
filter 4=4	
filter 5=5	
filter 6=6	

Displayed Error	Potential Cause
ERROR 0X0100	READ FUNCTION ABORTED
ERROR 0X0200	(MOTOR) COULD NOT FIND OPTO SENSOR
ERROR 0X0300	(MOTOR) COULD NOT FIND EDGE OF HOLE (AUTOCAL)
ERROR 0X0400	(MOTOR) FAILED POSITION VERIFY
ERROR 0X0500	FILTER WHEEL MISSING FILTER
ERROR 0X0600	(FILTER) GAIN OUT OF RANGE
ERROR 0X0700	READER FAILED NOISE TEST
ERROR 0X0800	READER FAILED OFFSET TEST
ERROR 0X0900	READ TIME (FILTER) DARK OUT OF RANGE
ERROR 0X0A00	READ TIME (FILTER) AIR/BLANK OUT
ERROR 0X0B00	INVALID (ASSAY NUMBER)
ERROR 0X0C00	PRINTER TIMED OUT
ERROR 0X0D00	CAL CHECK SUM ERROR
ERROR 0X0E00	FILTER WAVELENGTH SPECIFIED NOT IN FILTER TABLE
ERROR 0X0F00	FILTER SIGNAL OUT OF RANGE
ERROR 0X1000	CNFG DATA ERROR
ERROR 0X1100	CNFG CHECKSUM ERROR
ERROR 0X1200	CAL DATA ERROR
ERROR 0X1300	MOTOR NOT HOMED CORRECTLY (again)
ERROR 0X1400	ASSAY WANTS INCUBATION AND THERE ISN'T ANY
ERROR 0X1500	(HEATER ZONE) INCUBATOR FAILURE
ERROR 0X1600	COMPUTER CONTROL ASSAY DEFINITION ERROR
ERROR 0X1700	KINETIC INTERVAL TOO SHORT FOR SELECTED OPTIONS
ERROR 0X1800	TOO MANY KINETIC INTERVALS SELECTED
ERROR 0X1900	MEMORY ALLOCATION FAILURE
ERROR 0X1A00	STORE CURVE FAILURE
ERROR 0X1B00	GET CURVE FAILURE
ERROR 0X1C00	A/D CALIB STBY TRANSITION NOT DETECTED

ERROR 0X1D00	RESULTS DATA ERROR
ERROR 0XA100	TASK CONTROL BLOCK NOT AVAILABLE
ERROR 0XA200	READER FUNCTION ALREADY IN USE
ERROR 0XA300	(DEVICE) NOT AVAILABLE
ERROR 0XA400	FAILED CODE CHECKSUM TEST ON POWER UP
ERROR 0XA500	DR STEPS ALLOC/FREE ERROR
ERROR 0XA600	QUICK FLASH CONFIGURATION TIMED OUT
ERROR 0XA700	QUICK FLASH ERROR

The following errors would occur if the axis fails to home.

ERROR 0X0200	X AXIS (TRACK CARRIER) MOTOR COULD NOT FIND OPTO SENSOR
ERROR 0X0201	Y AXIS (FILTER WHEEL) MOTOR COULD NOT FIND OPTO SENSOR
ERROR 0X0202	Z AXIS (ROBOT LID LIFT) MOTOR COULD NOT FIND OPTO SENSOR

Probable cause: Disconnected sensor or motor. An obstruction that limits motor movement (a loud grinding would be heard at power up).

The following errors would occur if the expected axis move did not encounter the light beam when expected during the AUTOCAL process

ERROR 0X0300	X AXIS (TRACK CARRIER) FAILED TO FIND LIGHT BEAM
ERROR 0X0301	Y AXIS (FILTER WHEEL) DID NOT FIND HOME

These errors indicates a failure to find the light beam when the axis is moved to an expected position. The only time that this error would be seen for the track carrier is during the Auto-Calibration sequence.

Probable cause: X axis case: Loose belt, loose motor pulley or bad motor drive that causes the carrier to not move where it was sent. Filter Wheel motor case: Filter wheel not installed properly, filter wheel drive gear loose or motor drive failure causing inadequate filter wheel movement.

ERROR 0X0400	X AXIS (TRACK CARRIER) FAILED POSITION VERIFY
ERROR 0X0401	Y AXIS (FILTER WHEEL) FAILED POSITION VERIFY
ERROR 0X0402	Z AXIS (ROBOT LID LIFT) FAILED POSITION VERIFY

These errors indicate that an axis failed its position verify test. The position verify test keeps track of all axis moves so that when the axis returns home it is expected at a specific step count. If the axis stops early (to few steps) or late (to many steps), the test fails.

Probable cause: Belt slipping caused by incorrect tension, loose motor pulley or loose belt clamp. Filter Wheel has a loose setscrew on the hub. A bad motor driver circuit. Robot lift moter assembly has a worm leadscrew and internal brass fitting. Not enough lubricant on the robotic motor leadscrew.

ERROR 0X0500	FILTER IS NOT INSTALLED
---------------------	--------------------------------

This error indicates that the filter wheel has an open filter location.

Probable cause: All filter locations must have either a filter or a filter blank (BTI# 3122037) installed or this error will result. If the entire wheel is not installed this error will also result.

ERROR 0X0601	FILTER #1 GAIN OUT OF RANGE
ERROR 0X0602	FILTER #2 GAIN OUT OF RANGE
ERROR 0X0603	FILTER #3 GAIN OUT OF RANGE
ERROR 0X0604	FILTER #4 GAIN OUT OF RANGE
ERROR 0X0605	FILTER #5 GAIN OUT OF RANGE
ERROR 0X0606	FILTER #6 GAIN OUT OF RANGE

These errors indicate that the gain necessary to use the filter in question is out of the range necessary to assure performance to specifications.

Probable cause : A bad interference filter, missing filter, bad lamp and Misaligned optics.

ERROR 0700 READER FAILED NOISE TEST

This error indicates that the reader noise test failed. The reader noise test checks the DARK current signal level for stability. Dark current is measured with the light blocked at maximum measurement channel gain. Four groups of 96 readings are taken at 100ms intervals. This data is reduced to four averages which can not vary by 20 counts or a 0700 error will result. The out going production specification for this test is 12 counts of variation. 20 counts internal before unit flags error.

Probable cause: External signals getting in to the measurement circuit. The bottom and top shrouds should be correctly installed. This problem in a correctly assembled unit could indicate a bad main or analog board. Failure indicates excessive variation in the dark current (background) noise levels of the measurement circuit.

ERROR 0800 READER FAILED OFFSET TEST

This error indicates that the measurement electronics dark current offset is outside of acceptable limits at maximum gain. The noise signal level must be between 144 and 2019 counts or an error will be set.

Probable cause: Ambient light leak by having the cover open during the read or bad mother board.

ERROR 0X0900 READ TIME DARK VALUE OUT OF RANGE

This error indicates that the dark current value taken during the current read is significantly different then the same reading taken during the power up self check.

Probable cause: The measurement electronics background noise has changed since the last power up self check. Could be caused by a large increase in external ambient light since power up, Open door during reading, Photo-detectors heating up.

ERROR 0X0A00 READ TIME AIR BLANK OUT OF RANGE

This error indicates that the blank (full signal) reading taken during the current read has changed significantly from the same reading taken during the power up self check.

Probable cause: The measurement electronics full signal level has changed since the power up self check was last run. The bulb could be near failure or the optics could be interfered with or a dirty lamp connector.

ERROR 0X0B00 INVALID ASSAY

This error indicates that an assay number that is not programmed was selected.

ERROR 0X0C00 PRINTER TIMED OUT

This error indicates that the printer in use is not responding. This is due to the printer being off-line.

ERROR 0X0D00 CALIBRATION CHECK SUM ERROR

This error indicates that the stored check sum value for the calibration data does not match the actual check sum

ERROR 0X0E00 WAVELENGTH NOT FOUND IN FILER TABLE

This error indicates that the specified assay wavelength is not in the filter table. If a filter is added to the filter wheel the filter table must be updated or this error will occur.

ERROR 0X0F00 FILTER SIGNAL OUT OF RANGE

This error indicates that the filter (1-6) has a signal which is out of range. This error could be produced by putting a 340nm in a non "UV" instrument. This error could also be produced by having a blank filter in a position which is programmed to actually have a filter installed. The filter table must match the filters actually installed in the filter wheel.

ERROR 0X1000 CONFIGURATION DATA MISSING

This error indicates that necessary configuration data is missing from memory. Which probably means it was never downloaded or it was downloaded incorrectly.

ERROR 0X1100 FAILED CONFIGURATION CHECK SUM TEST

This error indicates that the stored checksum value from the configuration data does not match the actual checksum of the current configuration data. This means that the configuration data has changed and the check sum stored is no longer valid. The error is produced when outdated versions (old) of Extensions or Define Assay are used to create an assay configuration file. This file is incompatible with the operation code within the instruments memory. The fix for this problem is to recreate the assay definition on the correct version of assay definition software and re download it.

ERROR 0X1200 CALIBRATION DATA MISSING

This error means that AUTOCAL has not been performed after a memory erase or in the case of a new unprogrammed board immediately after the assay definition download. The system must have the AUTOCAL sequence performed. See section 9.1 in this manual. If a download of the basecode is performed and the new basecode revision number is much higher, the new basecode may overwrite the calibration values in memory.

ERROR 0X1300 MOTOR NOT HOMED

This error will occur if the error 0200 or error 0300 is ignored. The situation needs to be fixed before the instrument is used.

ERROR 0X1400 ASSAY INCUBATION ERROR

Assay requires incubation but the instrument does not have an incubator.

ERROR 0X1500 INCUBATOR FAILURE DURING ASSAY

Incubator failed to hold temperature within tolerances during the assay.

Incubator Failure Error Data

Bits	Zone	Error
7	3	Temperature out of range
6	2	Temperature out of range
5	1	Temperature out of range
4	0	Temperature out of range
3	3	Thermistor out of range or shorted
2	2	Thermistor out of range or shorted
1	1	Thermistor out of range or shorted
0	0	Thermistor out of range or shorted

Bit 6 Bit 1
 ↓ ↓

Examples: Error code (1540) → 40 hex = 0100 0000

Zone 2 temp out of range, unknown reason (A/D failure?)

Error code (1544) → 44 hex = 0100 0100

Zone 2 temp out of range, due to zone 2 thermistor bad.

Error code (15FF) → FF hex = 1111 1111

All zones temp out of range, due to all thermistors bad.

Any failure indicates a need to run a system test and look at the printout (or KCJR screen).

System Test Analysis

This chapter will discuss the analysis of the system test results when the technician or user initiates the System Test routine by

Test Options

The Utility Options Menu allows the user to select between four available utilities: Tests, Setup, Output and Read. The “soft” keys positioned under the menu options allow you to select the option.

S	E	L	E	C	T		U	T	I	L	I	T	Y		O	P	T	I	O	N	?		
T	E	S	T	S		S	E	T	U	P			O	U	T	P	U	T		R	E	A	D

Figure 8-2: Selecting Tests from the Utility Options screen

- **SOFT KEY 1:** Press this key to select TESTS.
- Use the **MAIN MENU** and **PREVIOUS SCREEN** keys to return to the Main Screen or move backwards through the menu structure.

The Tests screen allows the user to select which performance test to run. The options are **System**, **Checksum** and **Calibration Plate**.

System Self Test

When **SOFT KEY 1** is pressed, the *Automated Microplate Reader* runs the instrument's **System Test**, and reports results in a pass/fail format. The results are sent to the printer via the instrument's parallel port, and a printout similar to *Figure 8-4* is produced.

Operator ID: _____
 Notes: _____

09:38 AM 06/07/01 SYSTEM SELF TEST

Filter: 405 Gain: 7.76

Channel:	Ref	1	2	3	4	5	6	7	8
Air:	32008	49883	49380	52899	54967	54093	53382	52810	53269
Dark:	984	1077	1004	964	942	1006	972	969	1067
Delta:	31024	48806	48806	51935	54025	53087	52410	51841	52202

Filter: 450 Gain: 3.20

Channel:	Ref	1	2	3	4	5	6	7	8
Air:	28968	49883	49380	52899	54967	54093	53382	52810	53269
Dark:	467	421	479	460	438	481	433	476	458
Delta:	28024	48806	48806	51935	54025	53087	52410	51841	52202

Filter: 490 Gain: 3.37

Channel:	Ref	1	2	3	4	5	6	7	8
Air:	28968	49883	49380	52899	54967	54093	53382	52810	53269
Dark:	536	483	550	527	503	552	496	546	525
Delta:	28024	48806	48806	51935	54025	53087	52410	51841	52202

Filter: 630 Gain: 2.91

Channel:	Ref	1	2	3	4	5	6	7	8
Air:	28968	49883	49380	52899	54967	54093	53382	52810	53269
Dark:	382	346	392	376	360	394	355	390	374
Delta:	28024	48806	48806	51935	54025	53087	52410	51841	52202

Channel:	Ref	1	2	3	4	5	6	7	8
Noise Max	5322	4565	5343	5024	4805	5228	4712	5075	4822
Noise Min	5321	4564	5342	5021	4804	5227	4710	5073	4818
Delta:	1	1	1	3	1	1	2	2	4

09:38AM 09/25/95 INCUBATION SELF TEST

Temperature Setpoint: 37.0

Current Average: 36.7

A/D Test: Pass

Zone 1 Temp: 36.9	Min: 36.9	Max: 37.0	Range: PASS	Thermistor: PASS
Zone 2 Temp: 36.9	Min: 36.9	Max: 37.0	Range: PASS	Thermistor: PASS
Zone 3 Temp: 36.9	Min: 36.9	Max: 37.0	Range: PASS	Thermistor: PASS
Zone 4 Temp: 36.9	Min: 36.9	Max: 37.0	Range: PASS	Thermistor: PASS

Figure 8-4: Output Results of the System Test

NOTE: The incubation self test is only done on incubation equipped instruments (I versions).

System Test Analysis

Definitions:

Gain:	This value is stored in memory to determine the proper gain for the detection circuit to give a full light range to 45,000 – 60,000 counts. Every time the filter is used, the system knows to set to this gain. The range of the gain value is from 1.4 – 36.56 with the exception of the 340nm filter. The range is from 1.4 – 128. The gain value is determined by the %Transmittance of light (%T) through the filter. The higher the %T, the lower the gain value. This value is written into memory every time the system test is performed.
Air:	This is the full light reading. A target between 25,000 – 60,000 counts is to be achieved for each channel. This value cannot be above 60,000. The reader will give an error. The value for each channel is stored in memory to be compared during each read. If this value changes more than 40%, a 0800 or 0A00 error will be displayed. The Reference Channel values will be lower due to not having a focusing lens. The typical values are 13,000 – 30,000. The Reference Channel air value cannot exceed the Air values for each channel.
Dark:	This is the no-light value. This is the baseline value of the system without the light applied. This value is then subtracted from the Air Value. If this value exceeds 9000 counts, zero (0), or high enough where the Delta value is below 20,000, the reader will give an error. The value for each channel is stored in memory. If the value changes more than 20%, an error 0900 will be displayed.
Delta:	This is the value determined from the Air - Dark. The typical range is from 20,000 - 54,000. If this value is below 20,000, the reader will give an error. This value cannot exceed 60,000. The Reference Channel Delta value cannot go below 8,000 counts and exceed 30,000 counts. The Reference Channel value cannot exceed the delta values for each channel. The reader will give an error.
Hot Channel:	This is one of the eight channels that has the highest sensitivity. During the testing of each filter, as the gain is increased, the system monitors the eight channels to determine when one of the channels has reached the 55,000 target.
Noise Max/Min:	These values are determined at the start of the system test. The gain is set to 128 and no light is applied to the optic system. 100 Dark current readings are taken and the system determines the maximum and minimum value. The typical values range is 4,000 – 6,000. These values cannot exceed 10,000 counts. This value cannot be zero (0).
Noise Delta:	This value is derived from the Noise Max – Noise Min. If this value is above 21, the reader will give an error 0700. Typical values are between 0 – 6.

Note: When servicing this reader, Use the SystemTest Pass/Fail criteria found in the [Service Data Sheet](#).

Incubator Analysis

The incubator for the ELx808 has a built in diagnostics that is performed during every initialization. The incubator uses a precision resistor to verify the measurement circuit is operating properly. The test then verifies the four sensing thermistors located in each of the four quadrants in the measurement chamber. This is recorded and printed with the system test results. The temperature displayed on the front panel display is the average of the four quadrants. The system test results show the temperature for each quadrant. The system test result will give a pass/fail criterion for each quadrant.

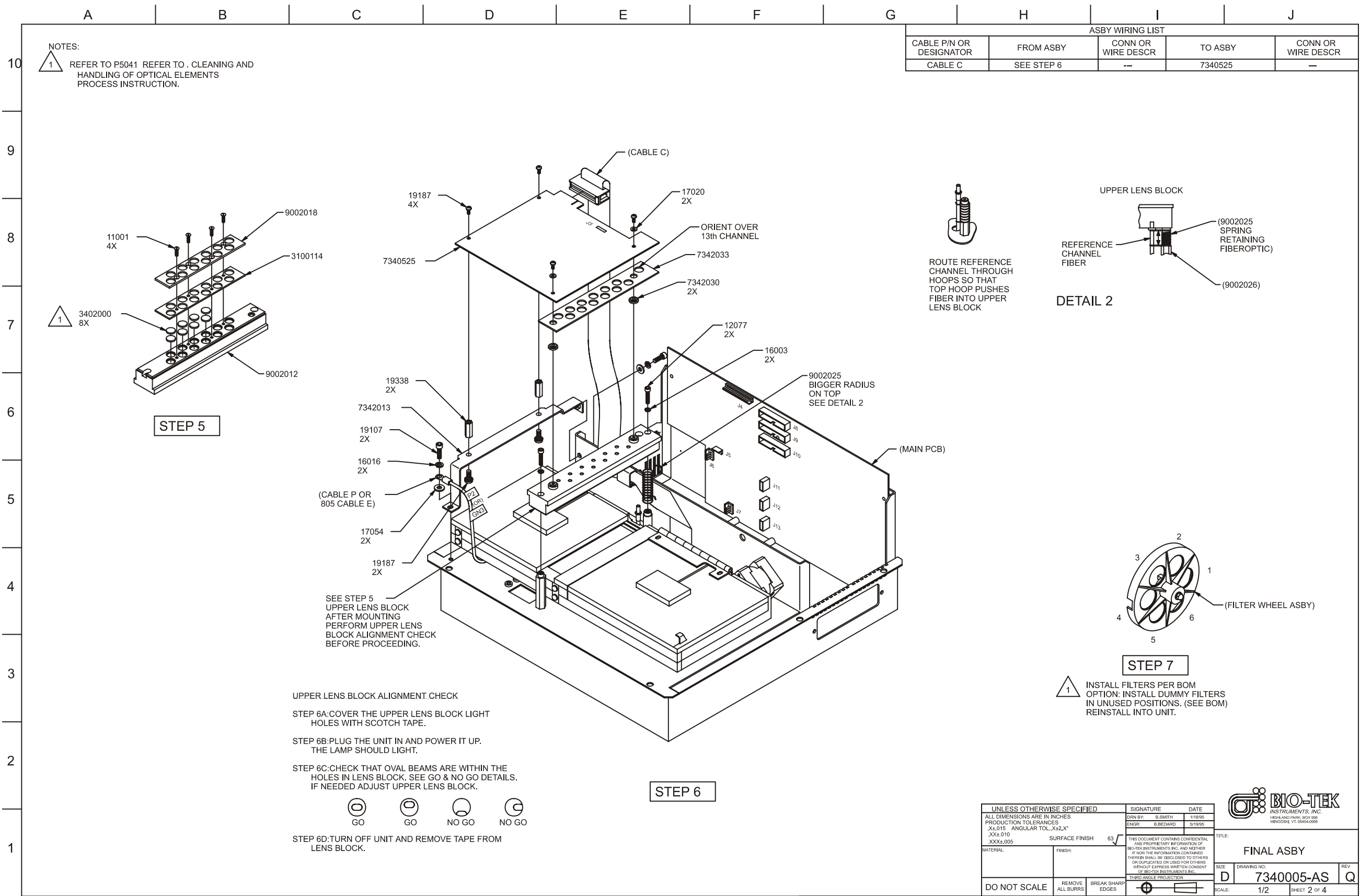
The software is continually monitoring each thermister and controlling the heaters to maintain a constant temperature.. It only allows a ± 3 degree C. delta from the set point before giving an error. Using four quadrants, the incubator circuit has redundancy built into it to ensure the accuracy of the measurement chamber temperature.

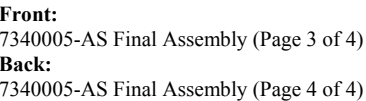
The accuracy can be measured using a digital thermometer with a thermister attached. The thermister is mounted to the plate carrier and the incubator is activated with a set point of 37 degrees C. We have a pass/fail criteria of $\pm .5$ degree C. delta.

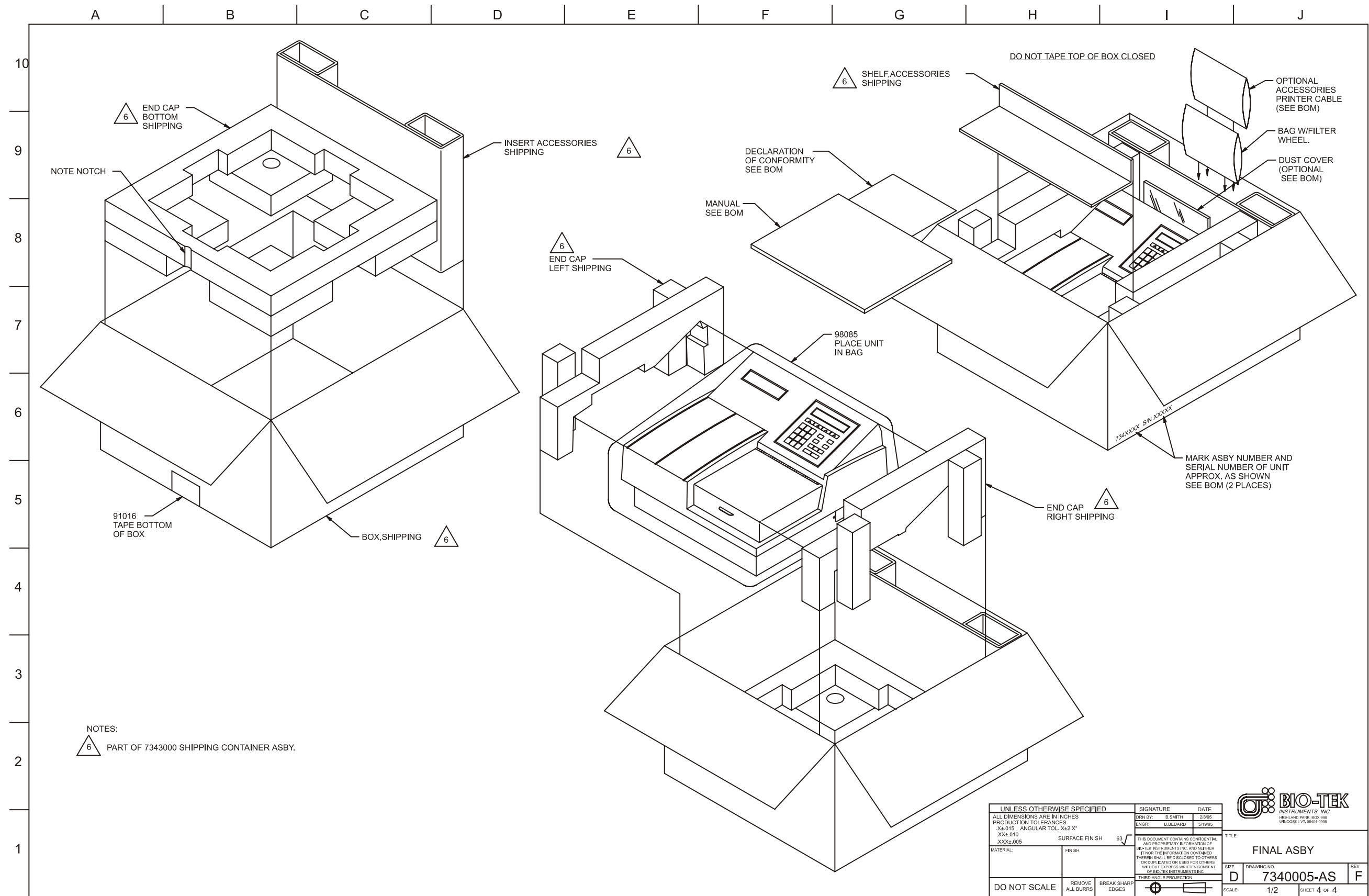
Assembly Drawings:

The following drawings are the assembly documentation used to assemble the ELx808 and it's variations. These drawings are subject to change.

- [7340005-AS Final Assembly \(Page 1 of 4\)](#), page 9-3
- [7340014-AS Kit Barcode Assembly \(Page 1 of 1\)](#), page 9-8
- [7340024-AS SVCE Kit Power Supply Retrofit \(Page 1 of 1\)](#), page 9-10
- [7340503-AS Cable Power Input Assembly \(Page 1 of 2\)](#), page 9-11
- [7340511-AS Track Robot with Incubation Assembly \(Page 1 of 4\)](#), page 9-13
- [7340513-AS Track Assembly \(Page 1 of 2\)](#), page 9-18
- [7340514-AS Track with Incubation \(Page 1 of 4\)](#), page 9-21
- [7340515-AS Track Robot Assembly \(Page 1 of 2\)](#), page 9-26
- [7340529-AS Mechanical Preassembled Robot \(Page 1 of 2\)](#), page 9-29
- [7340533-AS Top Case Assembly \(Page 1 of 1\)](#), page 9-32
- [7340539S-AS SVCE Robotic Motor Assembly \(Page 1 of 1\)](#), page 9-34
- [7343000-AS Shipping Container Assembly \(Page 1 of 1\)](#), page 9-36







7340005-AS Final Assembly (Page 4 of 4)

7340523 Mechanical Pre-Assembled Assembly rev G As of 10-12-01				
Item	Description	Rev	Qty	Remarks
12066	SCR PAN 4-40X3/8 PHILL SS	A	2	
12077	SCR SOCK CAP 6-32X1/2 SST	A	4	
12107	SCR PAN 6-32X1/2 PHILLIPS SS	A	6	
15003	LOCKNUT 6-32 SS	A	4	
15004	LOCKNUT 8-32 SS	A	2	
15005	NUT KEPS 4-40	A	5	
15007	LOCKNUT 4-40 SS	A	2	
15010	NUT KEPS 6-32	A	2	
15011	NUT KEPS 8-32	B	5	
17001	WSHR FLAT #8 SS	A	4	
17020	WSHR FLAT #6 SS .146ID	B	7	
17047	WSHR FL #12 .04" TK	A	2	
18008	WSHR FLANGED #4 NYLON	B	1	
19054	SCR SET 6-32X3/16 CUPPT BK	A	2	
19112	SCR SOCK CAP 4-40X3/8 SS	B	1	
19186	SEMS 6-32X1/4 ST PHIL ITOOTH	A	10	
19187	SEMS 4-40X1/4 ST PHIL ITOOTH	A	10	
23021	VOLT REG +ADJ 1.5A 317	C	1	
3110508	MOLDED FILTER WHEEL W/ MAGNET	A	1	
3111023	LABEL,GROUNDING SYMBOL	A	1	
3112002	RETAINER COUPLER	F	1	
3400508	49388 LAMP W/OUT LENS	B	1	
3402001	LENS CONDENSER BK7	C	1	
3402002	IR REFLECTING GLASS	D	1	
3402004	LENS, PLASTIC, UV	B	8	
42058	TIE WRAP 3"	A	2	
47010	INSUL NEOPRENE .75X3.25X1/16	A	2	
49166	FOOT RUBBER CONE BLACK	A	2	
49187	FSTNR,BLACK,6-32X1/2	B	2	
49489	CARD EDGE GUIDE	A	2	
49493	SPRING COIL	A	5	
49552	PAD THERMAL TO-218	A	1	
49588	FLAT CABLE MNT W/OCLAMP 1 1/4"	A	2	
49764	SCREW JACK 4-40X.625L THREADED	A	4	
66006	LOCTITE 242 BLUE	A	0	A/R
66022	LOCTITE 271 RED SEALANT (10CC)	B	0	A/R
7120576	OPTO SHORT LEAD ASBY	E	1	712 CABLE BC
7340501	CABLE ANALOG INT ASBY	C	1	CABLE C
7340503	CABLE POWER INPUT ASBY	D	1	CABLE H
7340504	CABLE FILTER WHEEL MOTOR ASBY	B	1	CABLE K
7340505	CABLE OPTO EXTENSION ASBY	B	1	CABLE B
7340506	CABLE LAMP ASBY	E	1	CABLE J
7340510	CABLE MOTOR EXTENSION ASBY	B	1	CABLE G
7342003	PAN BASE	H	1	
7342006	BLOCK OPTIC SPACER	C	1	
7342024	BRACKET LAMP ASBY MOUNTING	A	1	
7342025	BRACKET OPTICAL SENSOR MOUNT	A	1	
7342034	BRACKET FAN MOUNTING	A	2	
7342035	STANDOFF NVT OPTICAL BLOCK	B	2	
7342040	POST OPTIC BLOCK THREADED	C	3	
9000550	CABLE INCBR FAN	B	1	900 CABLE U
9002003	SPRING RETAINING LAMP	A	1	
9002004	SPACER LENS GLASS	B	6	
9002015	DIAPHRAGM LOWER LENS BLOCK	A	1	
9002016	LOWER LENS BLOCK SECTION 1	A	1	
9002017	LOWER LENS BLOCK SECTION 2	A	1	
9002026	STANDOFF LENS HOLDER 1	A	1	
9002027	STANDOFF LENS HOLDER 2	A	1	

7340005 Final Asby rev O As of 10-12-01				
Item	Description	Rev	Qty	Remarks
7331023	OVRLY KEYBOARD READER	B	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340006	GENERIC SUB FINAL ASBY	H	1	
7340513	TRACK ASBY	K	1	
7340533-AS	-TOP CASE ASBY	F	0	DOCUMENT ONLY
7340537	MECH PRE ASSEMBLED ASBY	E	1	
7342000	CASE TOP	I	1	
7342001	LID TOP CASE	H	1	
7342002	FIBER OPTICS SPRAY 380NM	F	1	
7770102	LABEL "FCC COMPLIANCE"	A	1	

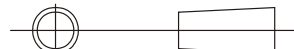
7340014 Kit Barcode Assembly rev D As of 10-12-01				
Item	Description	Rev	Qty	Remarks
12051	SCR PAN 4-40X7/8 PHILL SS	A	1	
16003	LKWSHR #6 HELICAL SPR SS	A	1	
16016	LKWSHR #8 HELICAL SPR SS	A	2	
17054	WSHR FL .188IDX.438ODX.049 SS	D	2	
17055	WSHR FL .156IDX.375ODX.049 SS	B	1	
19080	SCR SET 4-40X.25 SS CUP	A	2	
19107	SCR SOCK CAP 8-32X 3/8 SS	A	2	
19187	SEMS 4-40X1/4 ST PHIL ITOOTH	A	2	
25114	IC LT1080 RS232 DRU/RECEIVER	A	1	U3
27016	MOSFET N-CH 70AMP	C	1	Q1
28072	IC PVI1050 ISOLATOR MICRO ELEC	A	1	U2
32039	RES 1.00M OHM 1% 1/4W	B	1	R3
32232	RES 200.00OHM 1% 1/4W	B	1	R4
42058	TIE WRAP 3"	A	1	
42319	HEDR 4-P .100 PCB MOUNT GOLD	A	1	J3
49095	MOUNT CABLE TIE ADHESIVE	B	1	
7123012	SCANNER DECODER BOARD 7600	C	1	
7340528	CABLE BARCODE INTCON ASBY	A	1	CABLE S
7341006	TEST PROCEDURE BARCODE KIT	C	1	
7341006-AW	-TEST PROCEDURE BARCODE KIT	C	0	DOCUMENT ONLY
7341007	INSTALL INSTR BARCODE ELX808	D	1	
7341007-AW	INSTALL INSTR BARCODE ELX808	D	0	DOCUMENT ONLY
7342012	BRACKET BAR CODE SCANNER	A	1	
82003	CAP 10 uF 25V TANT	C	1	C2
82005	CAP 1uF 35V TANT	E	5	C1,10-13
91012	BOX 5X5X9 200# TEST WHITE	A	0	
97120	SCANNER MACHINE MOUNT 6600	A	1	

1. PLACE COMPLETED ASSEMBLY AND 71027 BUS WIRE (PER BOM) IN A PLASTIC BAG 99195.

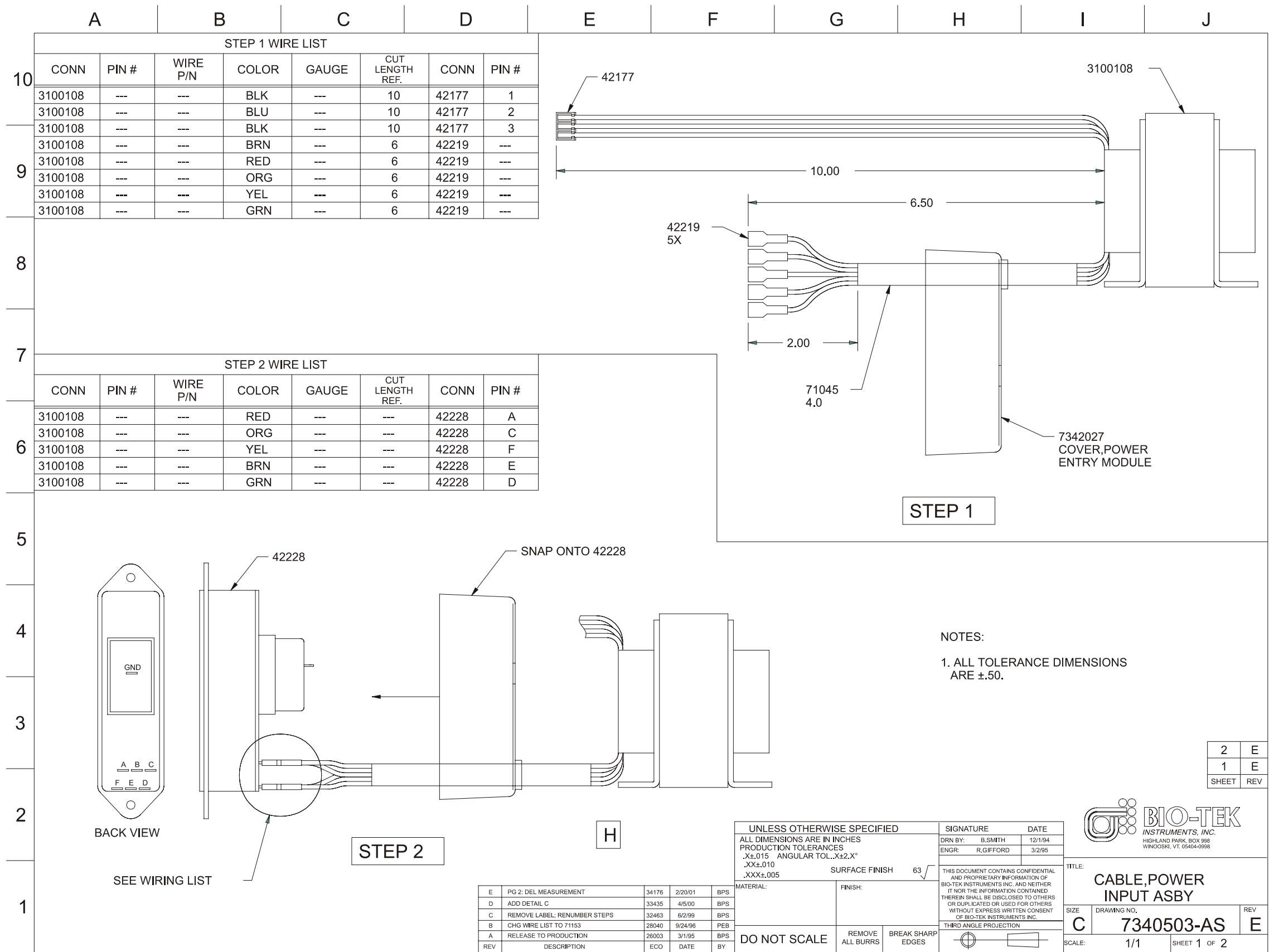
7340024 SVCE Kit Power Supply Retrofit rev C As of 10-12-01				
Item	Description	Rev	Qty	Remarks
12077	SCR SOCK CAP 6-32X1/2 SST	A	2	
15003	LOCKNUT 6-32 SS	A	2	
15005	NUT KEPS 4-40	A	1	
18008	WSHR FLANGED #4 NYLON	B	1	
19112	SCR SOCK CAP 4-40X3/8 SS	B	1	
23021	VOLT REG +ADJ 1.5A 317	C	1	
49552	PAD THERMAL TO-218	A	1	
71027	WIRE BUS 20 AWG	A	0.16	IN BAG 1, 2"
7340024-AS	SVCE KIT PWR SUPPLY RETROFIT	B	0	DOCUMENT ONLY
7342034	BRACKET FAN MOUNTING	A	1	
9440500	CABLE 3-PIN .100 SPACING 22GA	E	1	CABLE 944-GA
99195	BAG ANTI-STATIC ZIP LOCK 6X8	A	1	BAG 1

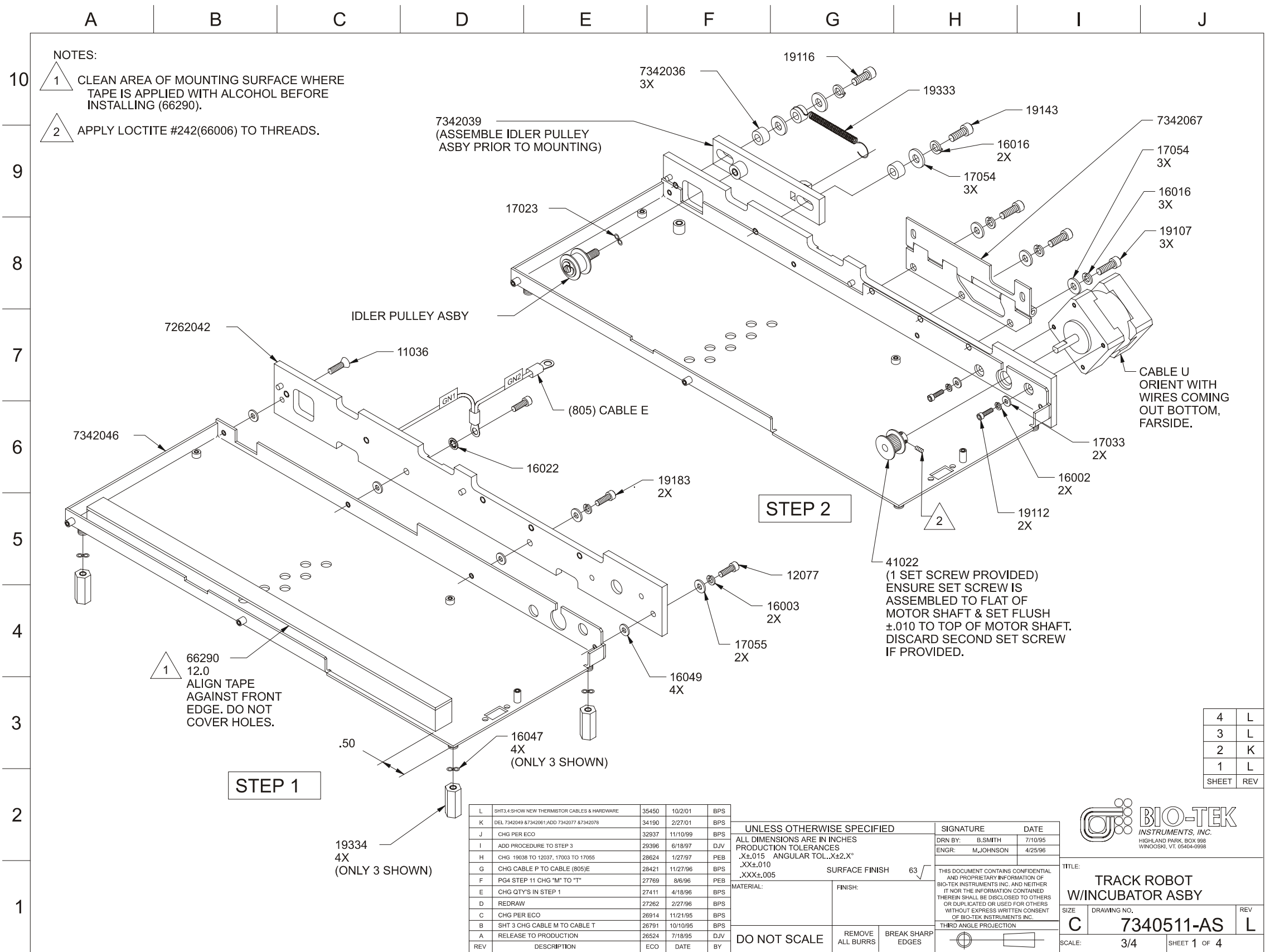


B	MODIFY NOTE 1	33918	10/10/00	BPS
A	RELEASE TO PRODUCTION	33427	4/4/00	BPS
REV	DESCRIPTION	ECO	DATE	BY

UNLESS OTHERWISE SPECIFIED			SIGNATURE		DATE	
ALL DIMENSIONS ARE IN INCHES PRODUCTION TOLERANCES .X±.015 ANGULAR TOL..X±2.X° .XX±.010 .XXX±.005 SURFACE FINISH 63 ✓			DRN BY: B.SMITH		3/24/00	
			ENGR: M.JOHNSON		4/7/00	
MATERIAL:			FINISH:		THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.	
DO NOT SCALE		REMOVE ALL BURRS	BREAK SHARP EDGES	THIRD ANGLE PROJECTION		
						

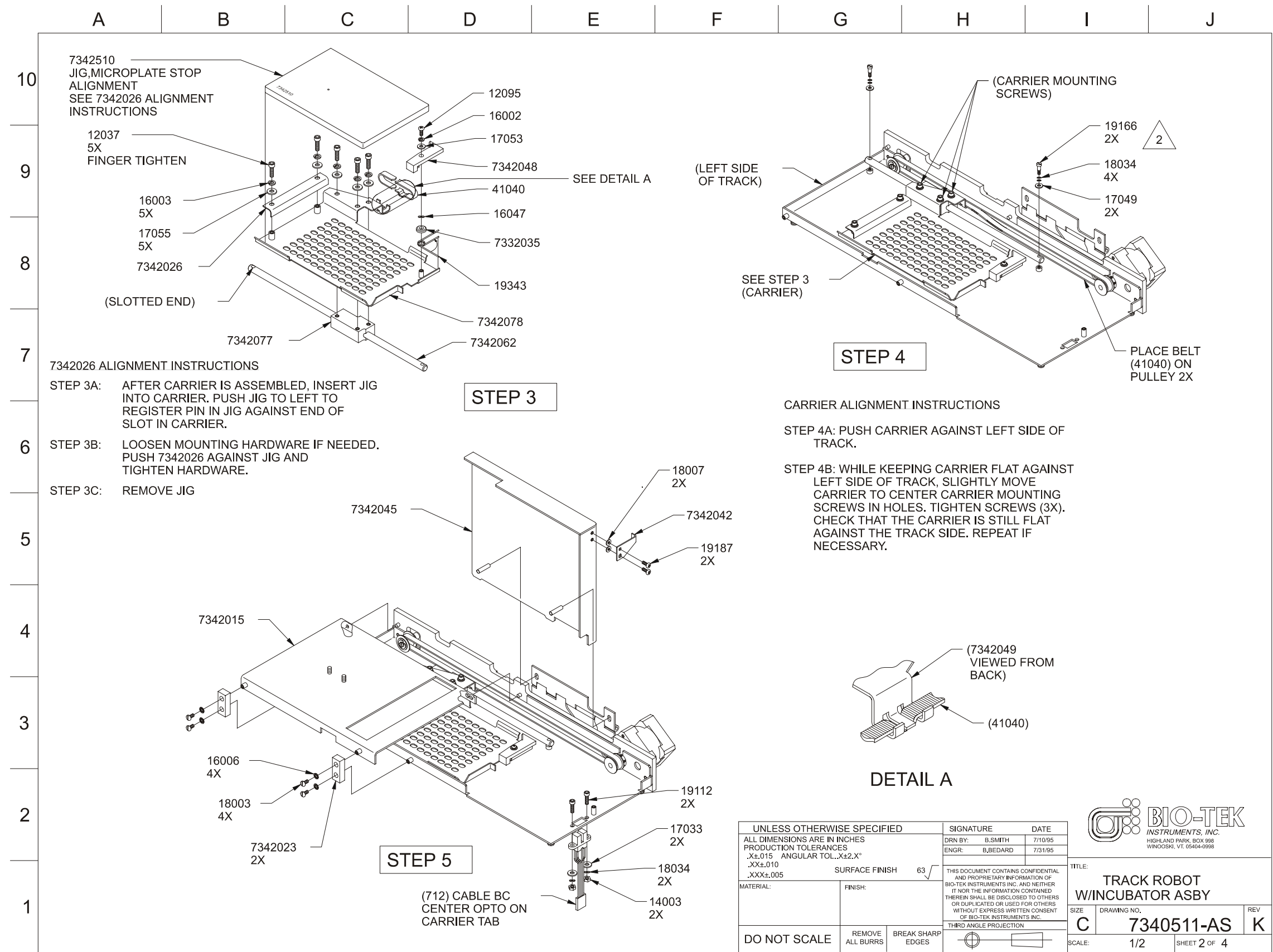
TITLE:		
SVCE KIT PWR SUPPLY RETROFIT		
SIZE	DRAWING NO.	REV
B	7340024-AS	B
SCALE:	1/1	SHEET 1 OF 1



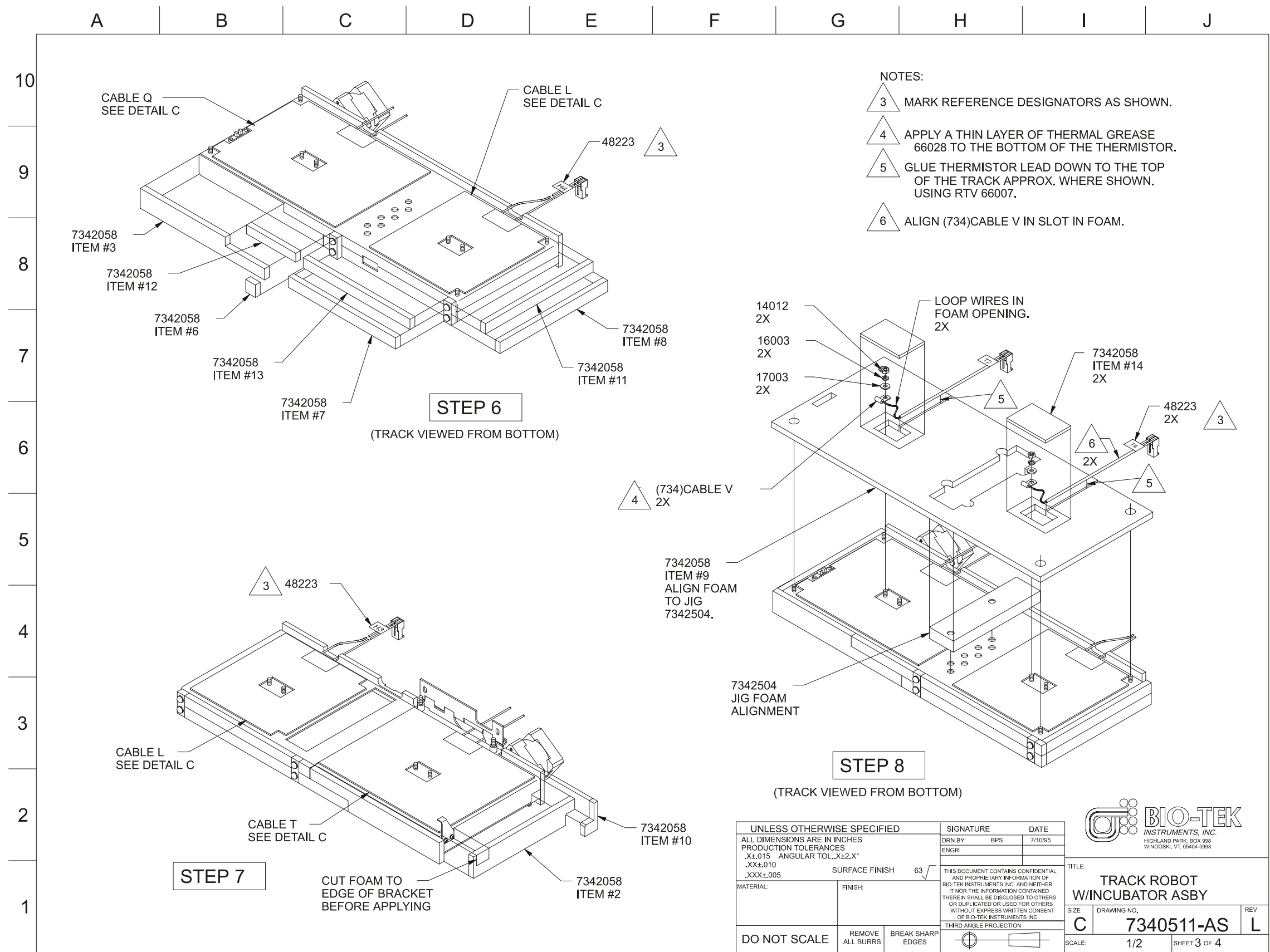


7340511-AS Track Robot with Incubation Assembly (Page 1 of 4)

Front:
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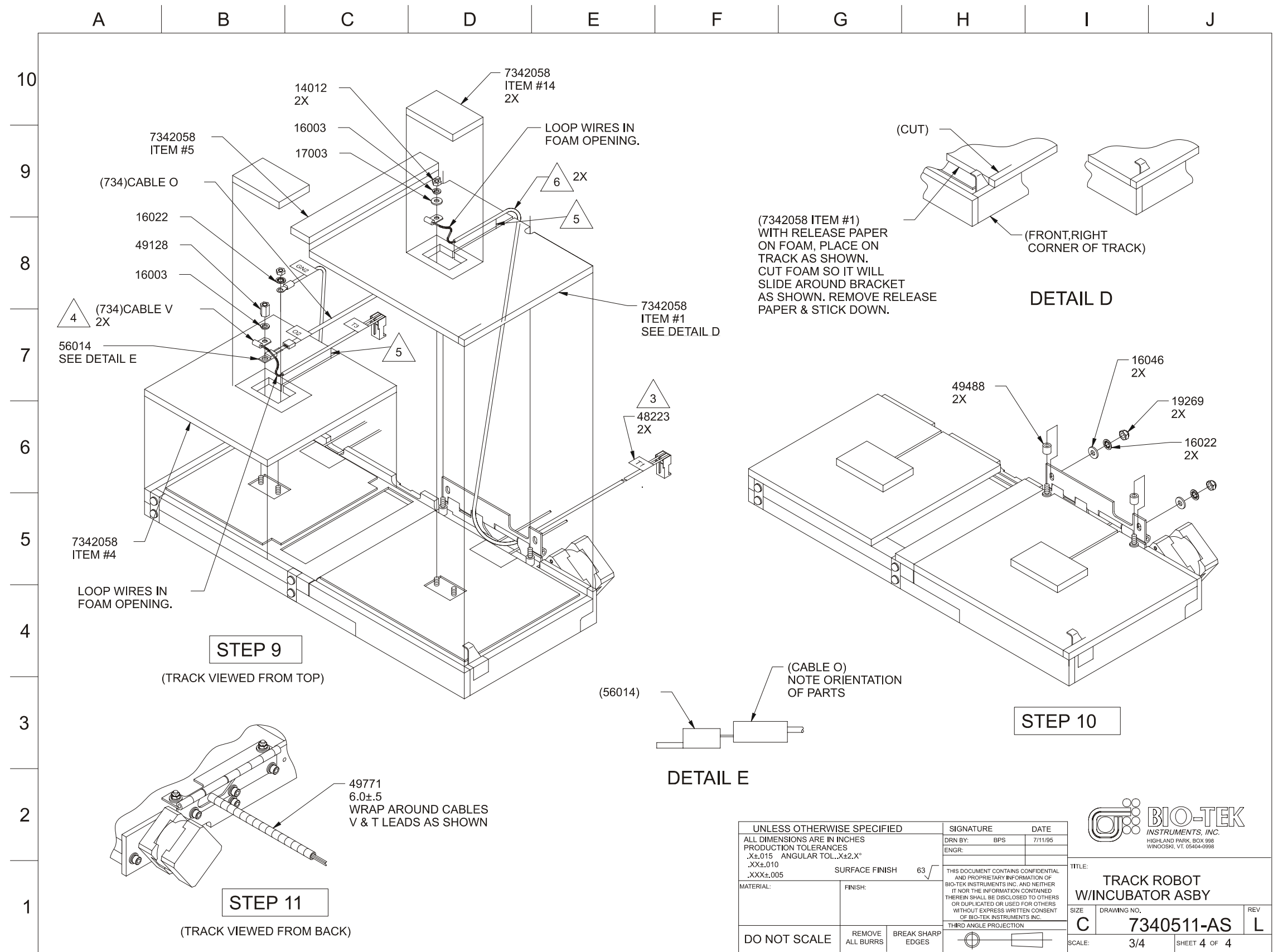


7340511-AS Track Robot with Incubation Assembly (Page 2 of 4)



7340511-AS Track Robot with Incubation Assembly (Page 3 of 4)

Front:
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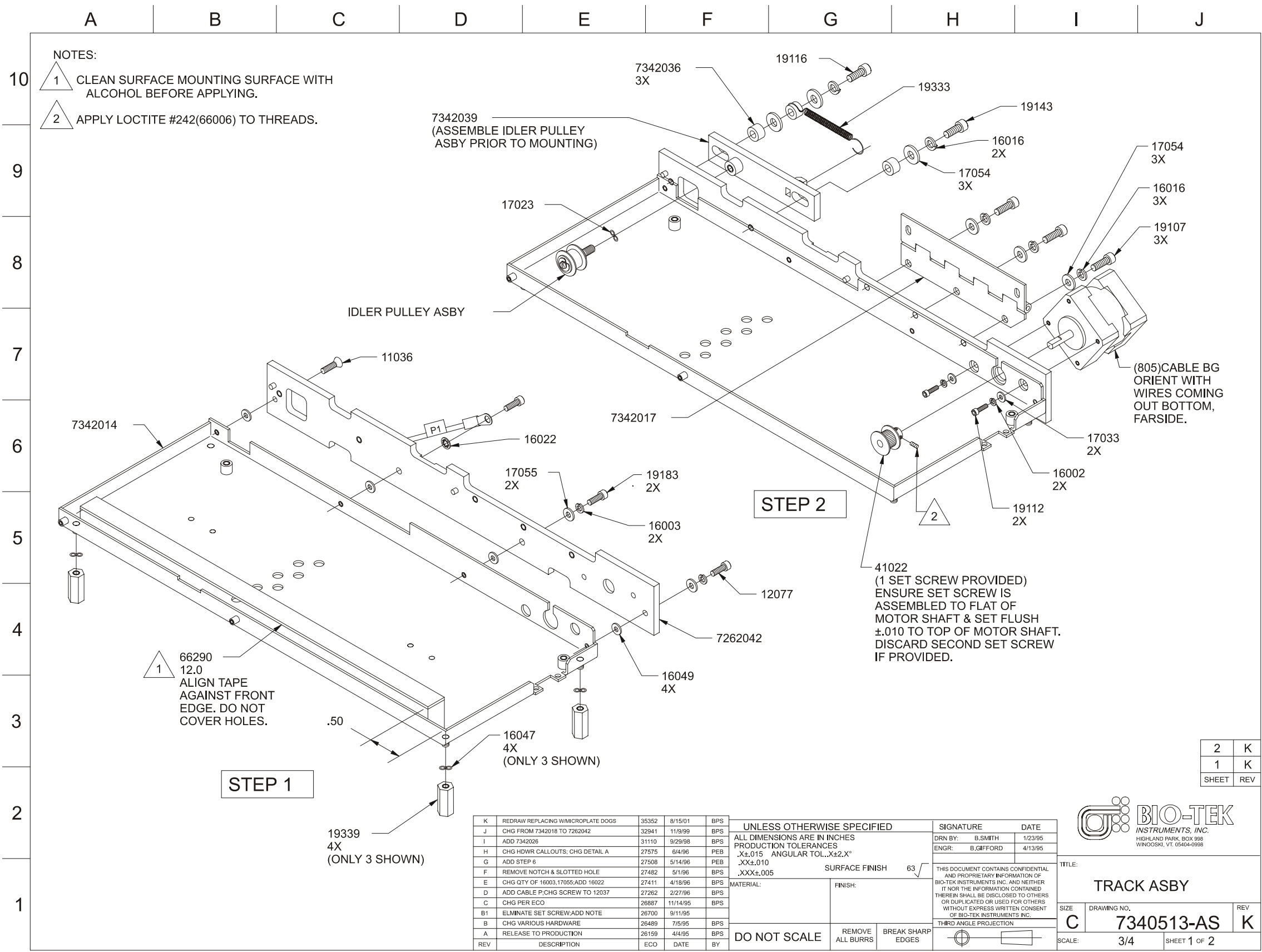


7340511-AS Track Robot with Incubation Assembly (Page 4 of 4)

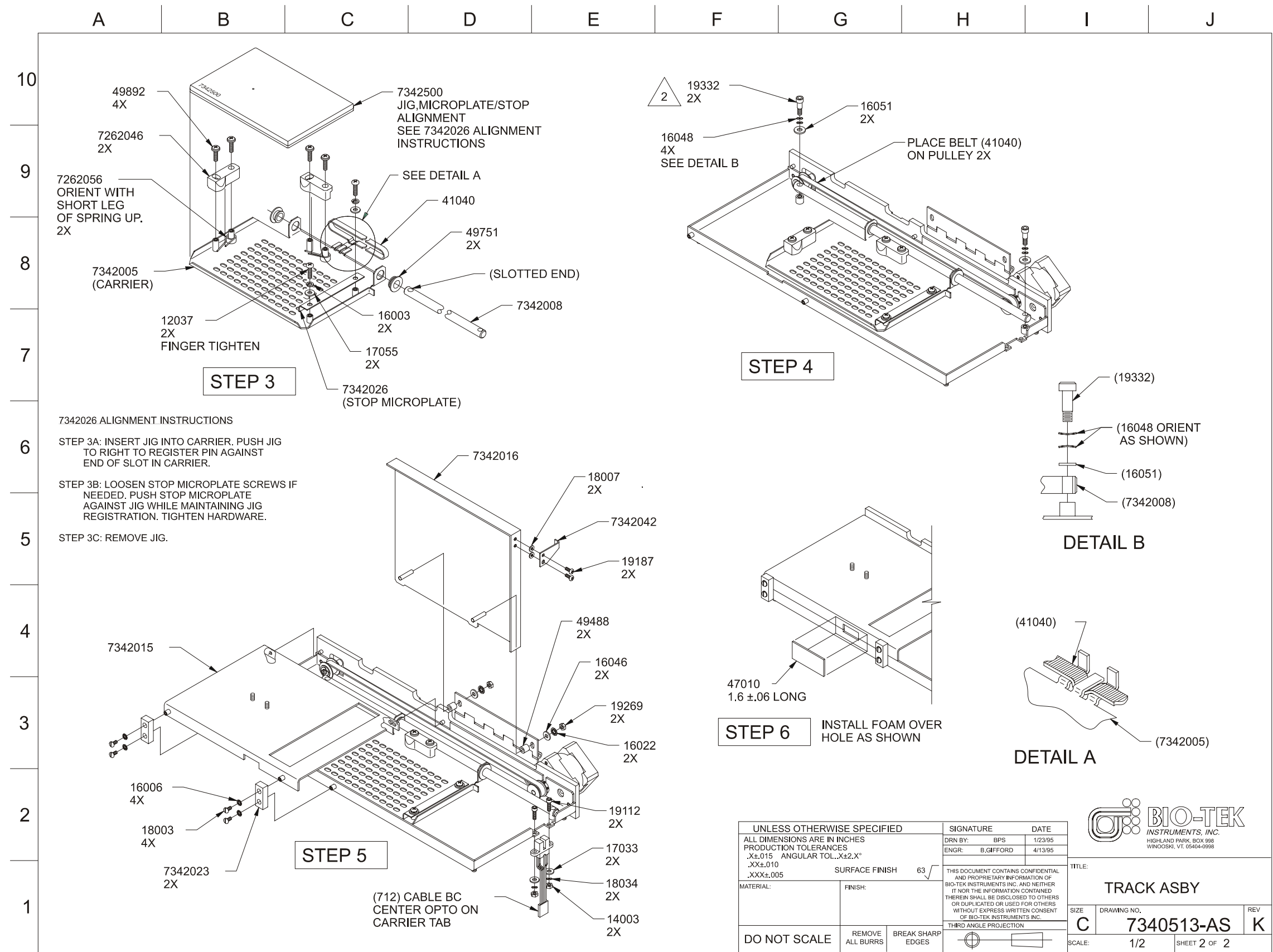
7340511 Track Robot with Incubation Assembly rev L As of 10-12-01 Page 1 of 2				
Item	Description	Rev	Qty	Remarks
11036	SCR FH 6-32X5/16 PHILLIPS SS	A	1	
12037	SCR PAN 6-32X5/16 PHILL SS	A	5	
12077	SCR SOCK CAP 6-32X1/2 SST	A	1	
12095	SCR PAN 4-40X3/16 PHILLIPS SS	A	1	
14003	NUT HEX 4-40 STEEL	C	2	
14012	NUT HEX 6-32 SS	A	4	
16002	LKWSHR #4 HELICAL SPR SS	A	3	
16003	LKWSHR #6 HELICAL SPR SS	A	3	
16003	LKWSHR #6 HELICAL SPR SS	A	11	
16006	LKWSHR #4 INT TOOTH SS	B	4	
16016	LKWSHR #8 HELICAL SPR SS	A	5	
16022	LKWSHR #6 INT TOOTH SS	A	4	
16046	WSHR .142IDX.505OD .062T NYLON	B	2	
16047	WASHER CURVED .174ID .322OD	A	5	
16049	WSHR FLAT .222IDX.50DX.07NYLON	A	4	
17023	WSHR SPRING WAVE #10 SS	A	1	
17033	WSHR FLAT #4 .125X.250 SS	B	4	
17049	WSHR FL .128IDX.188ODX.031TKSS	A	2	
17053	WSHR FL .125IDX.312ODX.032 SS	B	1	
17054	WSHR FL .188IDX.438ODX.049 SS	D	6	
17055	WSHR FL .156IDX.375ODX.049 SS	B	7	
18003	SCR PAN 4-40X1/4 B/W NYLON	A	4	
18007	WSHR FLAT #4 NY.115ID X .03THK	B	2	
18034	WSHR SPRING WAVE #4 SS	B	6	
19107	SCR SOCK CAP 8-32X 3/8 SS	A	3	
19112	SCR SOCK CAP 4-40X3/8 SS	B	4	
19116	SCR SOCK CAP 8-32X3/4 SS	B	1	
19143	SCR SOCK CAP#8-32X1/2 SS	A	1	
19166	SCR SHLDR 4-40 L.2505 D.1245	A	2	
19183	SCR SOCK CAP 6-32X3/8 SS	A	2	
19187	SEMS 4-40X1/4 ST PHIL ITOOTH	A	2	
19269	NUT CAP 6-32 HEX NYLON	A	2	
19333	SPRING EXTENSION 1.75L SS	B	1	
19334	SPCR FF 8-32 X .625 HEX NYLON	A	4	
19343	SPRING,TORSION,1.0L,.028WD,SS	A	1	
41022	MOTOR PULLEY	A	1	
41040	BELT TIMING 290T 3/16W D	B	1	
48223	LABEL, CABLE .50 X .35 X .75	B	6	
49128	SPCR FF 6-32X.25L HEXAL	B	1	
49488	SPACER.250X.250 .140ID PHEN.	A	2	
49771	WRAP SPIRAL 3/8" OD POLY	B	0.5	6"
56014	THERMOSTAT 60 DEGREES C TO220	A	1	
66006	LOCTITE 242 BLUE	A	0	A/R
66007	SILICON SEALANT AQUARIUM	A	0	A/R
66290	TAPE UHMW .030X.5 ADHES BACK	A	1	12"
7120576	OPTO SHORT LEAD ASBY	E	1	CABLE BC
7120595	IDLER PULLEY ASBY	B	1	
7262042	BACK INCUBATOR	C	1	
7332035	WSHR TOP COVER LOCATING	A	1	
7340511-AS	-TRACK ROBOT W/INCUBATION ASBY	K	0	DOCUMENT ONLY
7340521	CABLE TRACK HEATER #3	A	2	CABLE L
7340522	CABLE TRACK THERMISTAT	E	1	CABLE O
7340530	CABLE TRACK HEATER ASBY #4	A	1	CABLE Q
7340534	CABLE TRACK HEATER ASBY #5	A	1	CABLE T
7340536	CABLE ASBY TRACK MOTOR ROBOTIC	B	1	CABLE U

7340511 Track Robot with Incubation Assembly rev L As of 10-12-01 Page 2 of 2				
Item	Description	Rev	Qty	Remarks
7340541	CABLE THERMISTOR ASBY	A	4	734 CABLE V
7342015	TOP INCUBATOR	A	1	
7342023	BLOCK INCUBATOR TOP RETAINING	B	2	
7342026	STOP MICROPLATE	A	1	
7342036	SPACER TENSIONER	A	3	
7342039	BELT TENSIONER MOLDED	B	1	
7342042	BRACKET LID	D	1	
7342045	LID INCUBATOR ROBOTIC	A	1	
7342046	BOTTOM INCUBATOR ROBOTIC	A	1	
7342048	RETAINER MICROPLATE	D	1	
7342058	INSULATION SET TRACK W/ROBOT	A	1	
7342058-DG	-INSULATION SET TRACK W/ROBOT	A	0	DOCUMENT ONLY
7342062	SHAFT CARRIER ROBOTIC	F	1	
7342067	HINGE TRACK DR INCBR/ROBOTIC	C	1	
7342077	BLOCK CARRIER MTG ROBOTIC	A	1	
7342078	CARRIER MICROPLATE ROBOTIC	B	1	
7342504	JIG FOAM ALIGNMENT	B	0	TOOL ONLY
7342510	JIG MICROPL STOP ALIGN ROBOT	A	0	TOOL ONLY
8050529	CABLE CHAS-LWR CENT BASE ASBY	C	1	CABLE E

Front:
7340511 Track Robot with Incubation Assembly BOM
Back:
7340513-AS Track Assembly (Page 1 of 2)



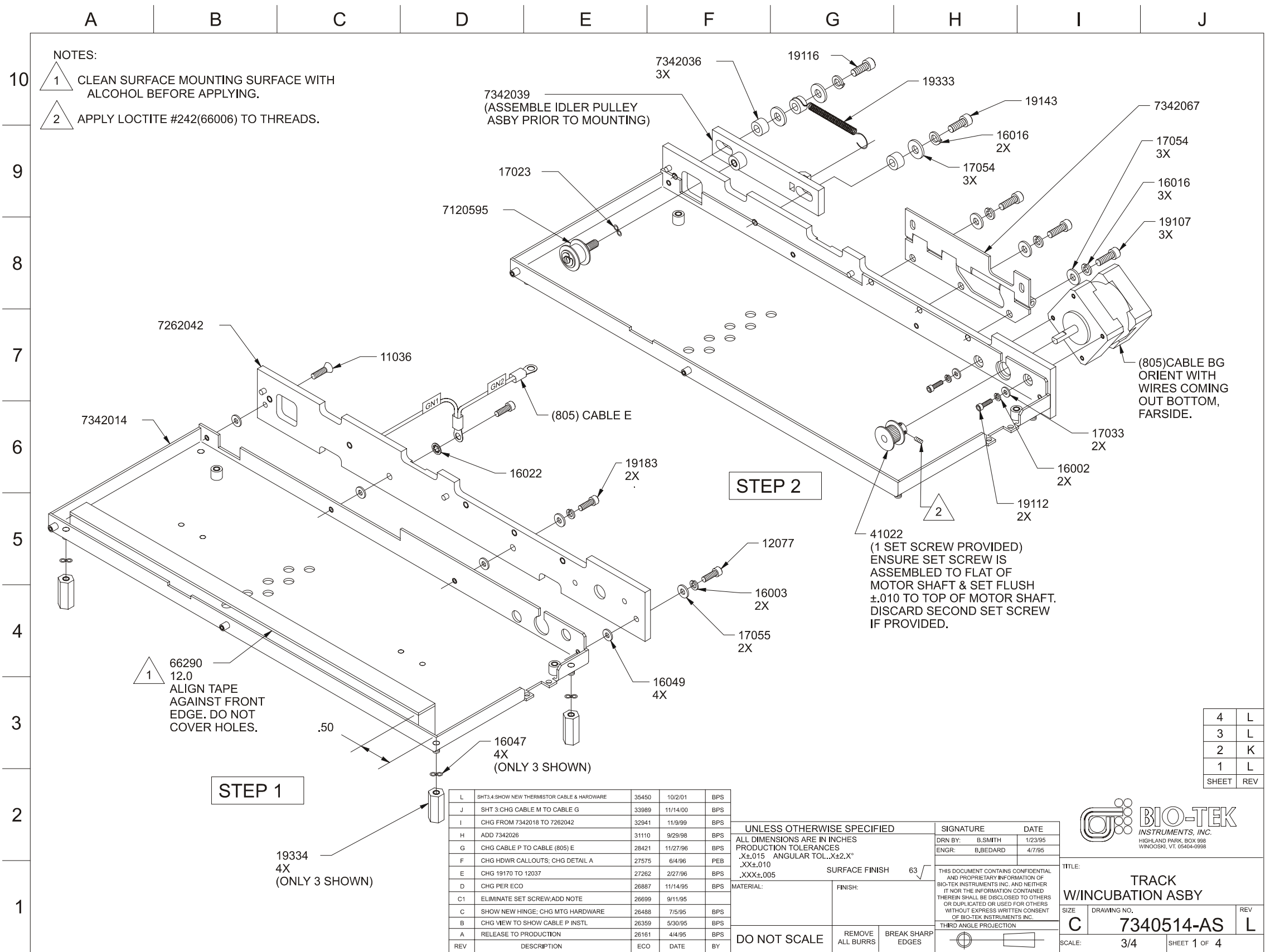
7340513-AS Track Assembly (Page 1 of 2)



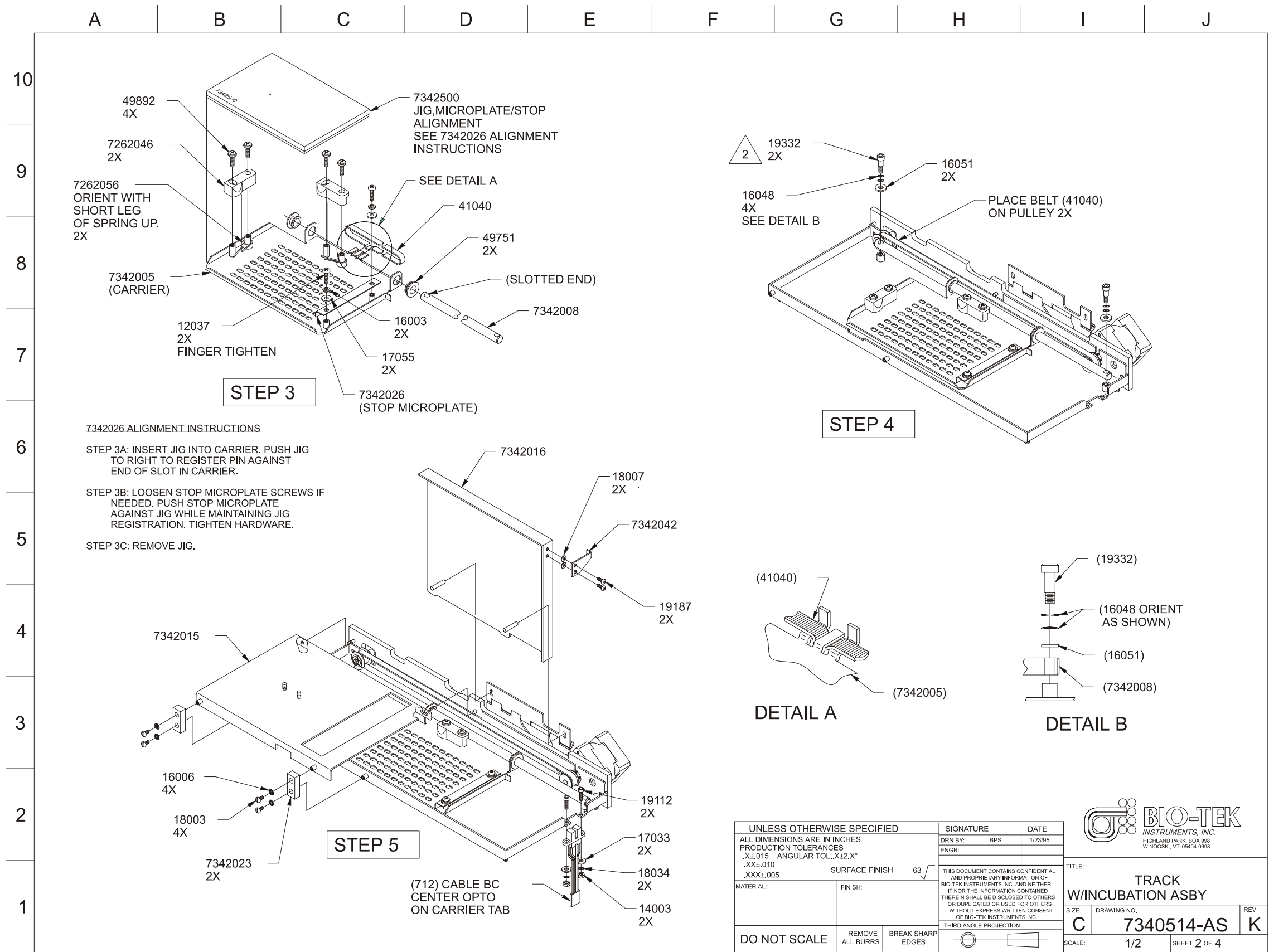
7340513-AS Track Assembly (Page 2 of 2)

Front:
7340513-AS Track Assembly (Page 2 of 2)
Back:
7340513 Track Assembly BOM

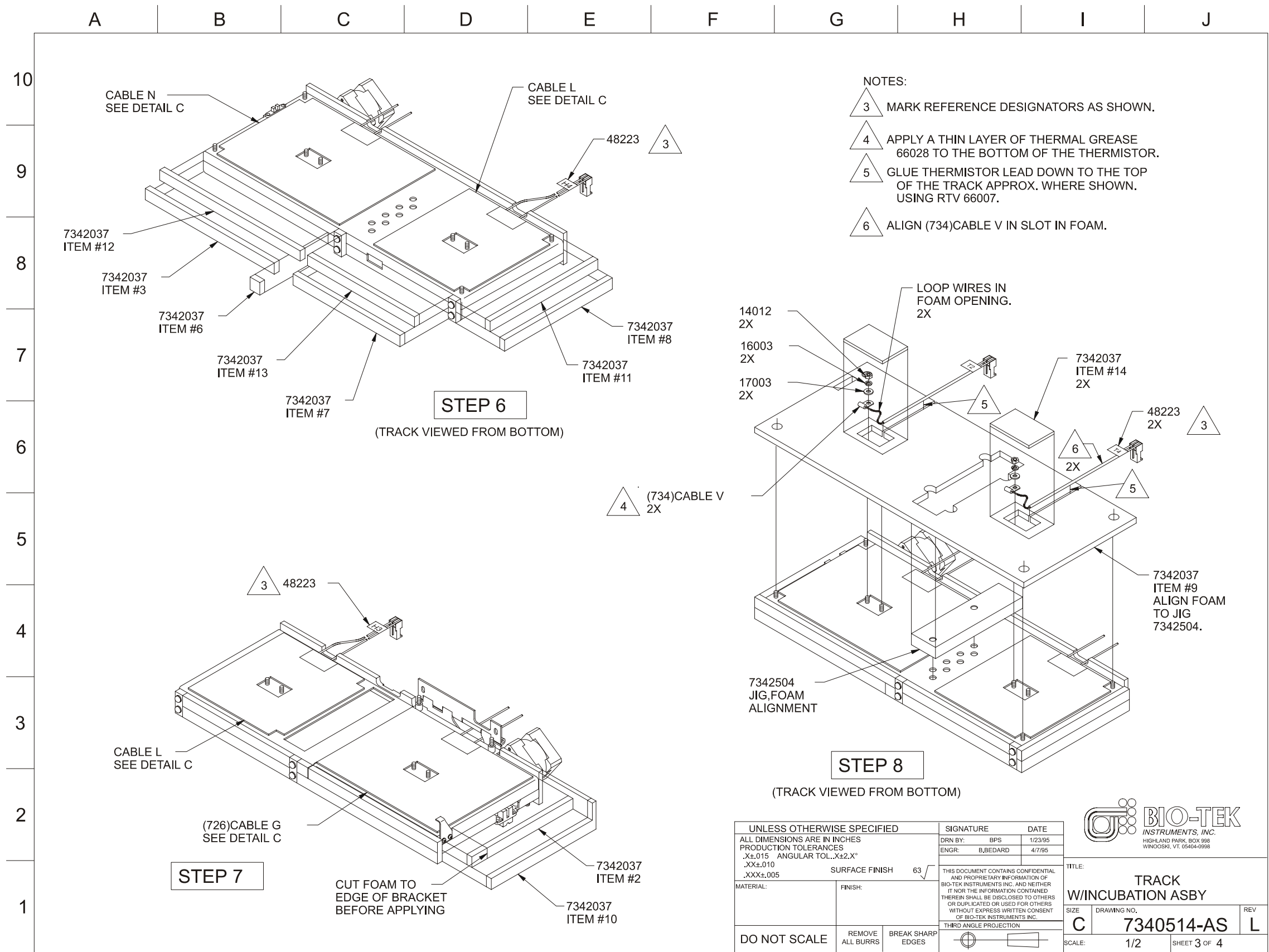
7340513 Track Assembly rev K As of 10-12-01				
Item	Description	Rev	Qty	Remarks
11036	SCR FH 6-32X5/16 PHILLIPS SS	A	1	
12037	SCR PAN 6-32X5/16 PHILL SS	A	2	
12077	SCR SOCK CAP 6-32X1/2 SST	A	1	
14003	NUT HEX 4-40 STEEL	C	2	
16002	LKWSHR #4 HELICAL SPR SS	A	2	
16003	LKWSHR #6 HELICAL SPR SS	A	4	
16006	LKWSHR #4 INT TOOTH SS	B	4	
16016	LKWSHR #8 HELICAL SPR SS	A	5	
16022	LKWSHR #6 INT TOOTH SS	A	3	
16046	WSHR .142IDX.505OD .062T NYLON	B	2	
16047	WASHER CURVED .174ID .322OD	A	4	
16048	WSHR CURVED .203ID .322OD SS	A	4	
16049	WSHR FLAT .222IDX.50DX.07NYLON	A	4	
16051	WSHR FL..194IDX.312ODX.04T SS	B	2	
17023	WSHR SPRING WAVE #10 SS	A	1	
17033	WSHR FLAT #4 .125X.250 SS	B	4	
17054	WSHR FL .188IDX.438ODX.049 SS	D	6	
17055	WSHR FL .156IDX.375ODX.049 SS	B	4	
18003	SCR PAN 4-40X1/4 B/W NYLON	A	4	
18007	WSHR FLAT #4 NY.115ID X .03THK	B	2	
18034	WSHR SPRING WAVE #4 SS	B	2	
19107	SCR SOCK CAP 8-32X 3/8 SS	A	3	
19112	SCR SOCK CAP 4-40X3/8 SS	B	4	
19116	SCR SOCK CAP 8-32X3/4 SS	B	1	
19143	SCR SOCK CAP#8-32X1/2 SS	A	1	
19183	SCR SOCK CAP 6-32X3/8 SS	A	2	
19187	SEMS 4-40X1/4 ST PHIL ITOOTH	A	2	
19269	NUT CAP 6-32 HEX NYLON	A	2	
19332	SCR SHLDR 6-32X.187ODX.375 SS	A	2	
19333	SPRING EXTENSION 1.75L SS	B	1	
19339	SPCR FF 8-32X5/8 5/16 HEX SS	B	4	
41022	MOTOR PULLEY	A	1	
41040	BELT TIMING 290T 3/16W D	B	1	
47010	INSUL NEOPRENE .75X3.25X1/16	A	0.5	CUT IN HALF
49488	SPACER.250X.250 .140ID PHEN.	A	2	
49751	BEARING .312ID SNAP-IN TEP642	C	2	
49892	FSTNR, BLACK,6-32X1/4	A	4	
66006	LOCTITE 242 BLUE	A	0	A/R
66290	TAPE UHMW .030X.5 ADHES BACK	A	1	12"
7120576	OPTO SHORT LEAD ASBY	E	1	CABLE BC
7120595	IDLER PULLEY ASBY	B	1	
7262042	BACK INCUBATOR	C	1	
7262046	DOG MICROPLATE RETAINING	C	2	
7262056	SPRING TORSION	A	2	
7340512	CABLE TRACK GND ASBY	B	1	CABLE P
7340513-AS	-TRACK ASBY	K	0	DOCUMENT ONLY
7342005	CARRIER MICROPLATE	G	1	
7342008	SHAFT MICROPLATE CARRIER	E	1	
7342014	BOTTOM INCUBATOR	C	1	
7342015	TOP INCUBATOR	A	1	
7342016	LID INCUBATOR	B	1	
7342017	HINGE TRACK DOOR	D	1	
7342023	BLOCK INCUBATOR TOP RETAINING	B	2	
7342026	STOP MICROPLATE	A	1	
7342036	SPACER TENSIONER	A	3	
7342039	BELT TENSIONER MOLDED	B	1	
7342042	BRACKET LID	D	1	
7342500	JIG MICROPLATE STOP ALIGN	E	0	TOOL ONLY
8050517	CABLE MOTOR ASBY	B	1	CABLE BG



Front:
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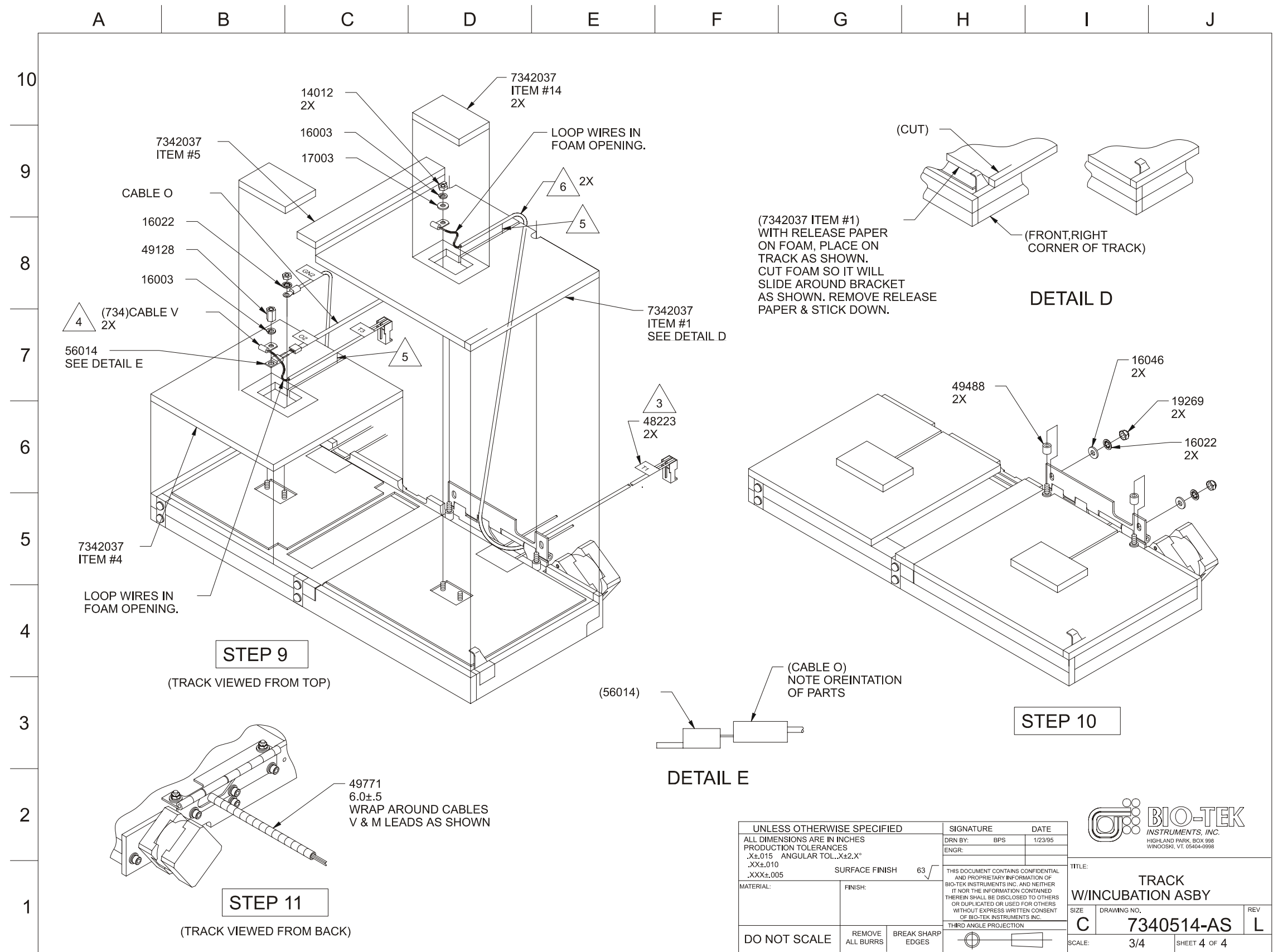


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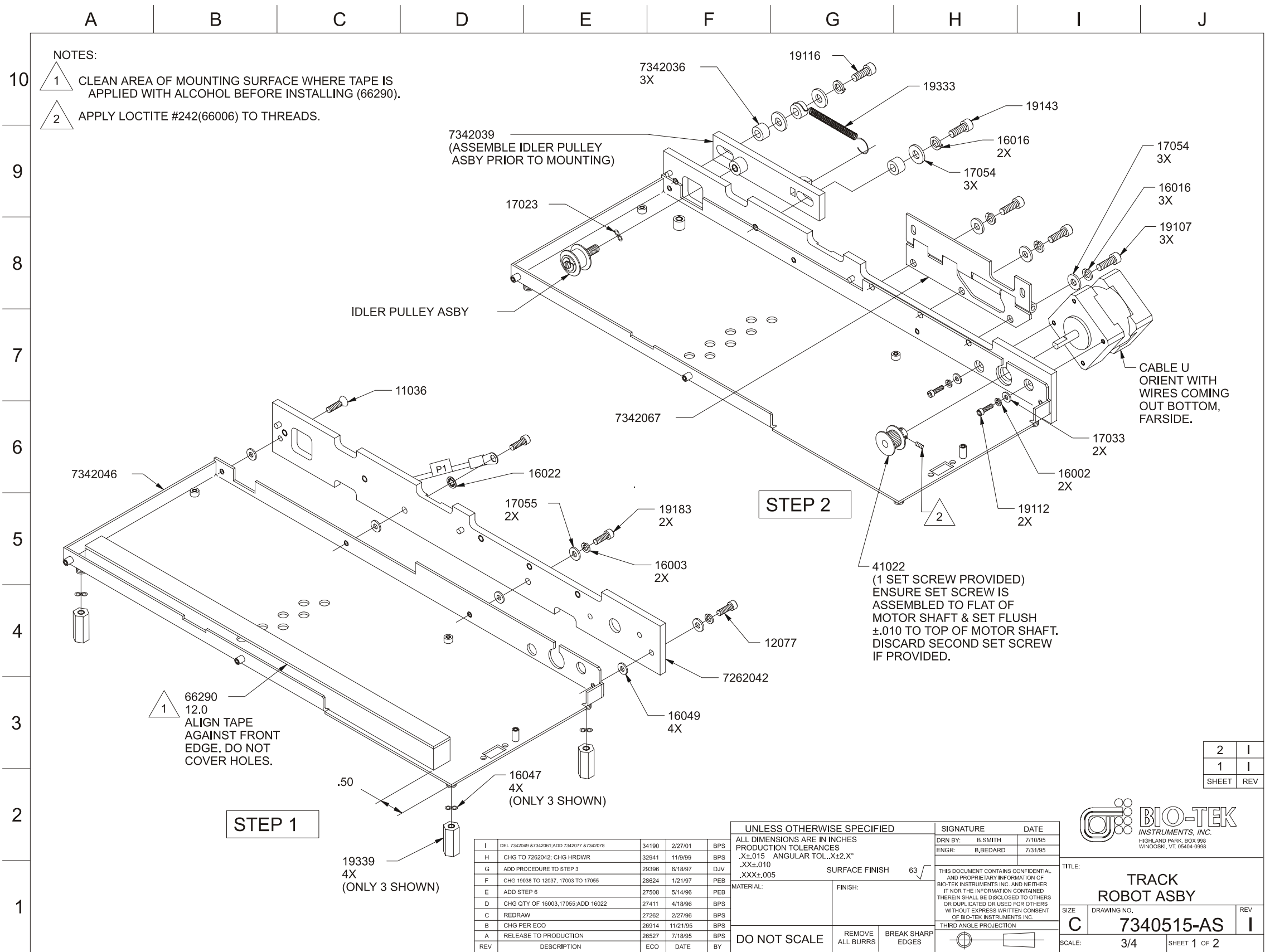
Front:
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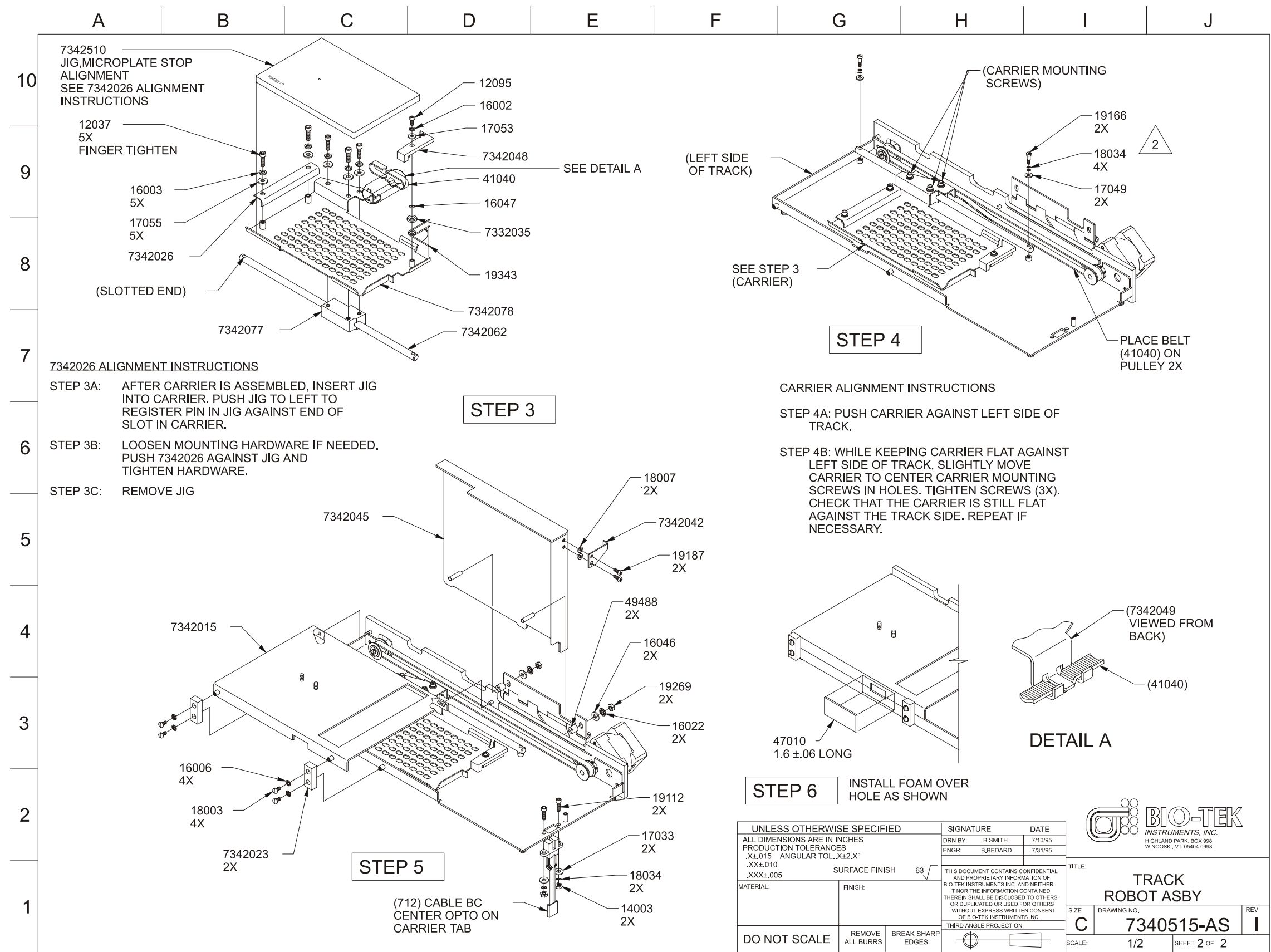
7340514-AS Track with Incubation (Page 4 of 4)

7340514 Track with Incubation Assembly rev M As of 10-12-01 Page 1 of 2				
Item	Description	Rev	Qty	Remarks
11036	SCR FH 6-32X5/16 PHILLIPS SS	A	1	
12037	SCR PAN 6-32X5/16 PHILL SS	A	2	
12077	SCR SOCK CAP 6-32X1/2 SST	A	1	
14003	NUT HEX 4-40 STEEL	C	2	
14012	NUT HEX 6-32 SS	A	4	
16002	LKWSHR #4 HELICAL SPR SS	A	2	
16003	LKWSHR #6 HELICAL SPR SS	A	12	
16006	LKWSHR #4 INT TOOTH SS	B	4	
16016	LKWSHR #8 HELICAL SPR SS	A	5	
16022	LKWSHR #6 INT TOOTH SS	A	4	
16046	WSHR .142IDX.505OD .062T NYLON	B	2	
16047	WASHER CURVED .174ID .322OD	A	4	
16048	WSHR CURVED .203ID .322OD SS	A	4	
16049	WSHR FLAT .222IDX.50DX.07NYLON	A	4	
16051	WSHR FL .194IDX.312ODX.04T SS	B	2	
17003	WSHR FL .156IDX.312OD	B	3	
17023	WSHR SPRING WAVE #10 SS	A	1	
17033	WSHR FLAT #4 .125X.250 SS	B	4	
17054	WSHR FL .188IDX.438ODX.049 SS	D	6	
17055	WSHR FL .156IDX.375ODX.049 SS	B	4	
18003	SCR PAN 4-40X1/4 B/W NYLON	A	4	
18007	WSHR FLAT #4 NY.115ID X .03THK	B	2	
18034	WSHR SPRING WAVE #4 SS	B	2	
19107	SCR SOCK CAP 8-32X 3/8 SS	A	3	
19112	SCR SOCK CAP 4-40X3/8 SS	B	4	
19116	SCR SOCK CAP 8-32X3/4 SS	B	1	
19143	SCR SOCK CAP#8-32X1/2 SS	A	1	
19183	SCR SOCK CAP 6-32X3/8 SS	A	2	
19187	SEMS 4-40X1/4 ST PHIL ITOOTH	A	2	
19269	NUT CAP 6-32 HEX NYLON	A	2	
19332	SCR SHLDR 6-32X.187ODX.375 SS	A	2	
19333	SPRING EXTENSION 1.75L SS	B	1	
19334	SPCR FF 8-32 X .625 HEX NYLON	A	4	
41022	MOTOR PULLEY	A	1	
41040	BELT TIMING 290T 3/16W D	B	1	
48223	LABEL, CABLE .50 X .35 X .75	B	6	
49128	SPCR FF 6-32X.25L HEXAL	B	1	
49488	SPACER.250X.250 .140ID PHEN.	A	2	
49751	BEARING .312ID SNAP-IN TEP642	C	2	
49771	WRAP SPIRAL 3/8" OD POLY	B	0.5	6"
49892	FSTNR, BLACK,6-32X1/4	A	4	
56014	THERMOSTAT 60 DEGREES C TO220	A	1	
66006	LOCTITE 242 BLUE	A	0	A/R
66007	SILICON SEALANT AQUARIUM	A	0	A/R
66290	TAPE UHMW .030X.5 ADHES BACK	A	1	12"
7120576	OPTO SHORT LEAD ASBY	E	1	CABLE BC
7120595	IDLER PULLEY ASBY	B	1	
7260521	CABLE TRACK HEATER #1	A	1	CABLE G
7262042	BACK INCUBATOR	C	1	
7262046	DOG MICROPLATE RETAINING	C	2	
7262056	SPRING TORSION	A	2	
7340514-AS	-TRACK W/INCUBATION ASBY	K	0	DOCUMENT ONLY
7340520	CABLE TRACK HEATER #2	A	1	CABLE N
7340521	CABLE TRACK HEATER #3	A	2	CABLE L
7340522	CABLE TRACK THERMISTAT	E	1	CABLE O

7340514 Track with Incubation Assembly rev M As of 10-12-01 Page 2 of 2				
Item	Description	Rev	Qty	Remarks
7340541	CABLE THERMISTOR ASBY	A	4	734 CABLE Y
7342005	CARRIER MICROPLATE	G	1	
7342008	SHAFT MICROPLATE CARRIER	E	1	
7342014	BOTTOM INCUBATOR	C	1	
7342015	TOP INCUBATOR	A	1	
7342016	LID INCUBATOR	B	1	
7342023	BLOCK INCUBATOR TOP RETAINING	B	2	
7342026	STOP MICROPLATE	A	1	
7342036	SPACER TENSIONER	A	3	
7342037	INSULATION SET TRACK	C	1	
7342037-DG	-INSULATION SET TRACK	C	0	DOCUMENT ONLY
7342039	BELT TENSIONER MOLDED	B	1	
7342042	BRACKET LID	D	1	
7342067	HINGE TRACK DR INCBR/ROBOTIC	C	1	
7342500	JIG MICROPLATE STOP ALIGN	E	0	TOOL ONLY
7342504	JIG FOAM ALIGNMENT	B	0	TOOL ONLY
8050517	CABLE MOTOR ASBY	B	1	CABLE BG
8050529	CABLE CHAS-LWR CENT BASE ASBY	C	1	CABLE E

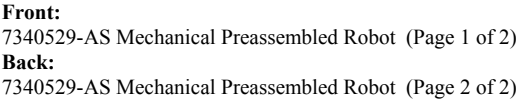


7340515-AS Track Robot Assembly (Page 1 of 2)



Front:
7340515-AS Track Robot Assembly (Page 2 of 2)
Back:
7340515 Track Robot Assembly BOM

7340515 Track Robot Assembly rev I As of 10-12-01				
Item	Description	Rev	Qty	Remarks
11036	SCR FH 6-32X5/16 PHILLIPS SS	A	1	
12037	SCR PAN 6-32X5/16 PHILL SS	A	5	
12077	SCR SOCK CAP 6-32X1/2 SST	A	1	
12095	SCR PAN 4-40X3/16 PHILLIPS SS	A	1	
14003	NUT HEX 4-40 STEEL	C	2	
16002	LKWSHR #4 HELICAL SPR SS	A	3	
16003	LKWSHR #6 HELICAL SPR SS	A	7	
16006	LKWSHR #4 INT TOOTH SS	B	4	
16016	LKWSHR #8 HELICAL SPR SS	A	5	
16022	LKWSHR #6 INT TOOTH SS	A	3	
16046	WSHR .142IDX.505OD .062T NYLON	B	2	
16047	WASHER CURVED .174ID .322OD	A	5	
16049	WSHR FLAT .222IDX.50DX.07NYLON	A	4	
17023	WSHR SPRING WAVE #10 SS	A	1	
17033	WSHR FLAT #4 .125X.250 SS	B	4	
17049	WSHR FL .128IDX.188ODX.031TKSS	A	2	
17053	WSHR FL .125IDX.312ODX.032 SS	B	1	
17054	WSHR FL .188IDX.438ODX.049 SS	D	6	
17055	WSHR FL .156IDX.375ODX.049 SS	B	7	
18003	SCR PAN 4-40X1/4 B/W NYLON	A	4	
18007	WSHR FLAT #4 NY.115ID X .03THK	B	2	
18034	WSHR SPRING WAVE #4 SS	B	6	
19107	SCR SOCK CAP 8-32X 3/8 SS	A	3	
19112	SCR SOCK CAP 4-40X3/8 SS	B	4	
19116	SCR SOCK CAP 8-32X3/4 SS	B	1	
19143	SCR SOCK CAP#8-32X1/2 SS	A	1	
19166	SCR SHLDR 4-40 L.2505 D.1245	A	2	
19183	SCR SOCK CAP 6-32X3/8 SS	A	2	
19187	SEMS 4-40X1/4 ST PHIL ITOOTH	A	2	
19269	NUT CAP 6-32 HEX NYLON	A	2	
19333	SPRING EXTENSION 1.75L SS	B	1	
19339	SPCR FF 8-32X5/8 5/16 HEX SS	B	4	
19343	SPRING,TORSION,1.0L,.028WD,SS	A	1	
41022	MOTOR PULLEY	A	1	
41040	BELT TIMING 290T 3/16W D	B	1	
47010	INSUL NEOPRENE .75X3.25X1/16	A	0.5	CUT IN HALF
49488	SPACER.250X.250 .140ID PHEN.	A	2	
66006	LOCTITE 242 BLUE	A	0	A/R
66290	TAPE UHMW .030X.5 ADHES BACK	A	1	12"
7120576	OPTO SHORT LEAD ASBY	E	1	CABLE BC
7120595	IDLER PULLEY ASBY	B	1	
7262042	BACK INCUBATOR	C	1	
7332035	WSHR TOP COVER LOCATING	A	1	
7340512	CABLE TRACK GND ASBY	B	1	CABLE P
7340515-AS	-TRACK ROBOT ASBY	I	0	DOCUMENT ONLY
7340536	CABLE ASBY TRACK MOTOR ROBOTIC	B	1	CABLE U
7342015	TOP INCUBATOR	A	1	
7342023	BLOCK INCUBATOR TOP RETAINING	B	2	
7342026	STOP MICROPLATE	A	1	
7342036	SPACER TENSIONER	A	3	
7342039	BELT TENSIONER MOLDED	B	1	
7342042	BRACKET LID	D	1	
7342045	LID INCUBATOR ROBOTIC	A	1	
7342046	BOTTOM INCUBATOR ROBOTIC	A	1	
7342048	RETAINER MICROPLATE	D	1	
7342062	SHAFT CARRIER ROBOTIC	F	1	
7342067	HINGE TRACK DR INCBR/ROBOTIC	C	1	
7342077	BLOCK CARRIER MTG ROBOTIC	A	1	
7342078	CARRIER MICROPLATE ROBOTIC	B	1	
7342510	JIG MICROPL STOP ALIGN ROBOT	A	0	TOOL ONLY



7340529 Mechanical Preassembled Robot rev G As of 10-12-01				
Item	Description	Rev	Qty	Remarks
14003	NUT HEX 4-40 STEEL	C	2	
16003	LKWSHR #6 HELICAL SPR SS	A	1	
16016	LKWSHR #8 HELICAL SPR SS	A	4	
17003	WSHR FL .156IDX.312OD	B	1	
17033	WSHR FLAT #4 .125X.250 SS	B	2	
17054	WSHR FL .188IDX.438ODX.049 SS	D	4	
18034	WSHR SPRING WAVE #4 SS	B	2	
19055	SCR SOCK CAP 6-32X5/8 BLK	A	1	
19059	SCR SET 6-32X1/8 NYLON TIP SS	B	2	
19107	SCR SOCK CAP 8-32X 3/8 SS	A	4	
19112	SCR SOCK CAP 4-40X3/8 SS	B	2	
19187	SEMS 4-40X1/4 ST PHIL ITOOTH	A	4	
49751	BEARING .312ID SNAP-IN TEP642	C	1	
66001	EPOXY	A	0	A/R
66039	GREASE, LINEAR WAY	A	0	A/R
7120576	OPTO SHORT LEAD ASBY	E	1	CABLE BC
7332028	SPACER TENSION ARM	C	1	
7340404	MAIN PCB W/ROBOT MTR DRVR ASBY	H	1	
7340523	GENERIC PRE-ASSEMBLED ASBY	G	1	
7340529-AS	-MECH PREASSEMBLED ASBY ROBOT	H	0	DOCUMENT ONLY
7340531	CABLE MOTOR LID LIFT ASBY	B	1	CABLE R
7342043	TIP LINEAR ACTUATOR	A	1	
7342050	HOME BLOCK ACTUATOR	C	1	
7342051	BRACKET ACTUATOR MOUNTING	A	1	
7342063	ROLLER ACTUATOR	A	1	

The following BOM is used for non-robotic units.

7340537 Mechanical Pre Assembled Assembly rev E As of 10-12-01				
Item	Description	Rev	Qty	Remarks
42058	TIE WRAP 3"	A	1	
7340406	DIGITAL PCB ASBY	E	1	
7340523	GENERIC PRE-ASSEMBLED ASBY	G	1	
7340529-AS	-MECH PREASSEMBLED ASBY ROBOT	H	0	DOCUMENT ONLY



7340006 Generic Final Assembly rev H As of 10-12-01				
Item	Description	Rev	Qty	Remarks
11001	SCR FH 4-40X1/4 SS SLOT	A	4	
12077	SCR SOCK CAP 6-32X1/2 SST	A	2	
14012	NUT HEX 6-32 SS	A	5	
16002	LKWSHR #4 HELICAL SPR SS	A	6	
16003	LKWSHR #6 HELICAL SPR SS	A	7	
16016	LKWSHR #8 HELICAL SPR SS	A	14	
17020	WSHR FLAT #6 SS .146ID	B	2	
17033	WSHR FLAT #4 .125X.250 SS	B	2	
17053	WSHR FL .125IDX.312ODX.032 SS	B	4	
17054	WSHR FL .188IDX.438ODX.049 SS	D	6	
17055	WSHR FL .156IDX.375ODX.049 SS	B	5	
19107	SCR SOCK CAP 8-32X 3/8 SS	A	14	
19112	SCR SOCK CAP 4-40X3/8 SS	B	4	
19145	SCR SOCK CAP#4-40X1/4" SS	A	2	
19187	SEMS 4-40X1/4 ST PHIL ITOOTH	A	6	
19189	SEMS 6-32X3/8 ST PHIL ITOOTH	A	4	
19338	SPACER FF 4-40 X .375 5/16HEX	A	2	
3100114	GASKET NEOPR 310	B	1	
3402000	LENS, BICONVEX BK7	C	8	
42058	TIE WRAP 3"	A	2	
49095	MOUNT CABLE TIE ADHESIVE	B	2	
49173	TAPE DOUBLE SIDED 3/4"W 180"L	A	0.12	1.5"
7340401	DISPLAY/KEYBRD PCB ASBY	C	1	
7340502	CABLE DISPLAY KEYBOARD ASBY	A	1	CABLE D
7340525	PCB ANALOG W/DIODES ASBY	G	1	
7341002	OVRLY REAR	D	1	
7342007	MASK OPTICAL	B	1	
7342013	BRACKET PCB MOUNTING	B	1	
7342030	SPACER PCB	B	2	
7342032	HINGE TOP CASE	B	1	
7342033	GASKET DIODE	B	1	
7342041	BRACKET COVER SPRING	D	1	
7342068	PLATE OUTER COVER MOUNTING	A	1	
9002012	UPPER LENS BLOCK	A	1	
9002018	LENS RETAINER UPPER LENS BLOCK	A	1	
9002025	SPRING RTNG FIBEROPTIC	A	1	

Note 1: Some of the parts listed in the 7340006 BOM are not used within the 7340533 assembly.

Note 2: See the appropriate final assembly for the overlays and for any parts not listed in the 7340006 BOM that are needed for the 7340533 assembly.

7340539S SVCE Robotic Motor Assembly rev A As of 10-12-01				
Item	Description	Rev	Qty	Remarks
14003	NUT HEX 4-40 STEEL	C	1	
16003	LKWSHR #6 HELICAL SPR SS	A	1	
17003	WSHR FL .156IDX.312OD	B	1	
17033	WSHR FLAT #4 .125X.250 SS	B	2	
18034	WSHR SPRING WAVE #4 SS	B	2	
19055	SCR SOCK CAP 6-32X5/8 BLK	A	1	
19059	SCR SET 6-32X1/8 NYLON TIP SS	B	2	
19112	SCR SOCK CAP 4-40X3/8 SS	B	2	
19187	SEMS 4-40X1/4 ST PHIL ITOOTH	A	4	
48225	LABEL WHITE .80 X .25	C	1	MARK P/N 7340539S
66001	EPOXY	A	0	A/R
66039	GREASE, LINEAR WAY	A	0	A/R
7120576	OPTO SHORT LEAD ASBY	E	2	CABLE BC
7262100	BRACKET DOOR ACTUATOR MOUNTING	A	1	
7332028	SPACER TENSION ARM	C	1	
7340531	CABLE MOTOR LID LIFT ASBY	B	1	CABLE R
7340539S-AS	SVCE ROBOTIC MOTOR ASBY	A	0	DOCUMENT ONLY
7342043	TIP LINEAR ACTUATOR	A	1	
7342050	HOME BLOCK ACTUATOR	C	1	
7342063	ROLLER ACTUATOR	A	1	
7342509	JIG SPACER ACTUATOR TIP	A	0	TOOL ONLY
8050606-TP	TESTER STEPPER MOTOR ASBY	E	0	DOCUMENT ONLY
9000600	OPTO TRIP BOX	B	0	TOOL ONLY
98083	BAG,9X12 PLASTIC 2MIL	A	0	

Front:
7340539S SVCE Robotic Motor Assembly BOM
Back:
7343000-AS Shipping Container Assembly (Page 1 of 1)
7343000 Shipping Container Assembly BOM

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B

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G

H

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J

7342052

NOTE NOTCH

7342054

7342057

TAPE BOTTOM OF BOX WITH 3" BROWN REINFORCED GUMMED TAPE.(3X)

7342053

7342055

7342056

7343000 Shipping Container Assembly rev E As of 10-12-01

Item	Description	Rev	Qty	Remarks
7342052	END CAP BOTTOM SHIPPING	C	0	
7342052-DG	-END CAP BOTTOM SHIPPING	C	0	DOCUMENT ONLY
7342053	SHELF ACCESSORIES SHIPPING	B	0	
7342053-DG	-SHELF ACCESSORIES SHIPPING	B	0	DOCUMENT ONLY
7342054	INSERT ACCESSORIES SHIPPING	C	0	
7342054-DG	-INSERT ACCESSORIES SHIPPING	C	0	DOCUMENT ONLY
7342055	END CAP LEFT SHIPPING	C	0	
7342055-DG	-END CAP LEFT SHIPPING	C	0	DOCUMENT ONLY
7342056	END CAP RIGHT SHIPPING	C	0	
7342056-DG	-END CAP RIGHT SHIPPING	C	0	DOCUMENT ONLY
7342057	BOX SHIPPING	E	0	
7342057-DG	-BOX SHIPPING	E	0	DOCUMENT ONLY
7343000-AS	SHIPPING CONTAINER ASBY	B	0	DOCUMENT ONLY

NOTES:

1. BEFORE SHIPPING TO BTI
ASSEMBLE BOX AS SHOWN. CLOSE
TOP OF BOX, DO NOT TAPE.

B	SHOW BOX TAPED IN 3 PLACES	30944	8/25/98	BPS
A	RELEASE TO PRODUCTION	26463	6/27/95	BPS
REV	DESCRIPTION	ECO	DATE	BY

UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X±.015 ANGULAR TOL..X±2,X°
.XX±.010 SURFACE FINISH 63√
MATERIAL:

FINISH:

DO NOT SCALE

REMOVE ALL BURRS

BREAK SHARP EDGES

SIGNATURE

DATE

DRN BY: B.SMITH 6/21/95

ENGR: B.BEDARD 6/30/95

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THIRD ANGLE PROJECTION

BIO-TEK

INSTRUMENTS, INC.

HIGHLAND PARK, BOX 998

WINDSOR, VT. 05404-0998

TITLE:

SHIPPING CONTAINER ASBY

SIZE C

DRAWING NO. 7343000-AS

REV B

SCALE: 1/4

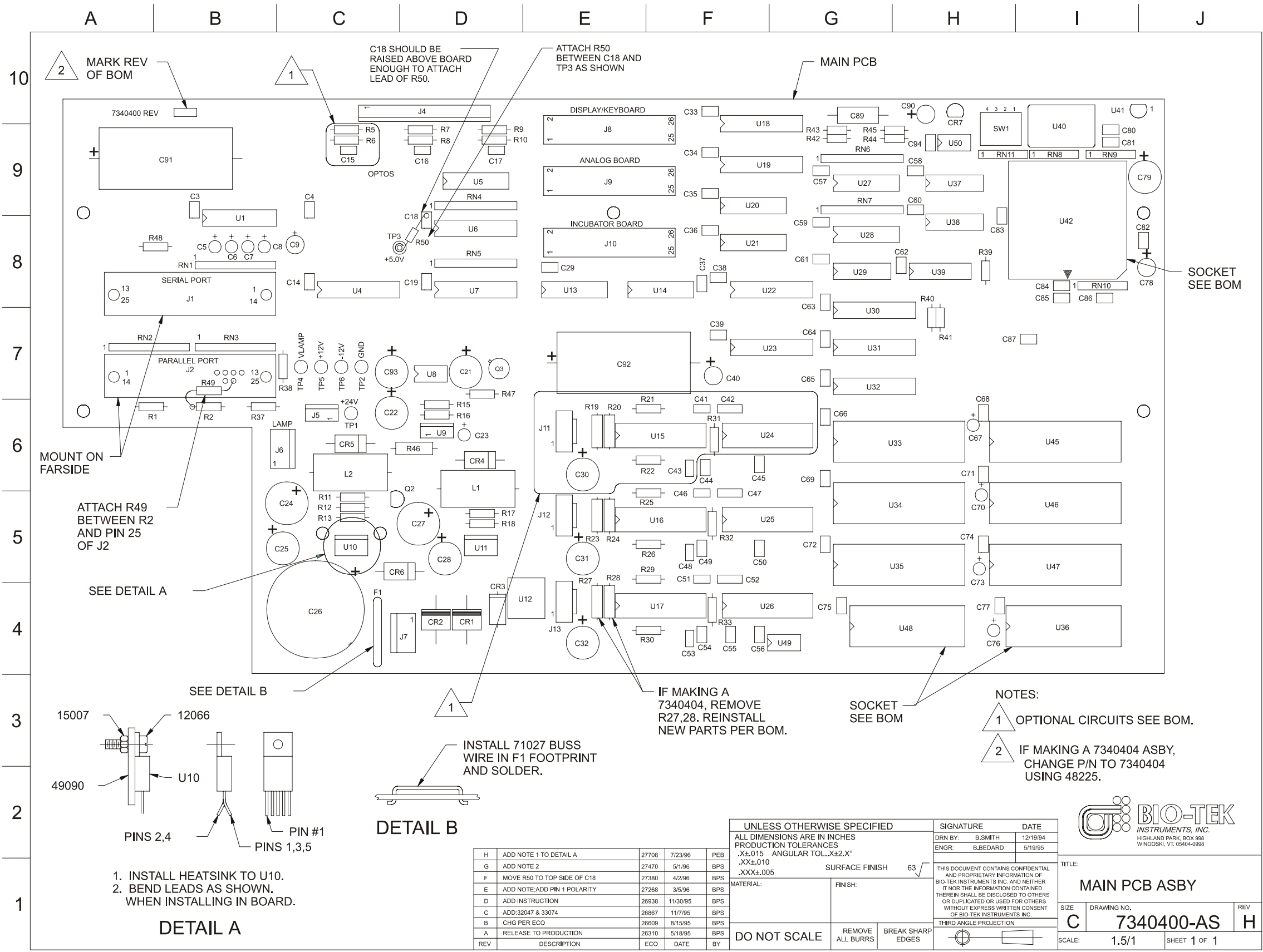
SHEET 1 OF 1

Chapter 10

Schematic Diagrams

The following are the schematic diagrams describing the electrical circuits within the ELx808 and it's variations. These are subject to change.

[7340400-AS Main PCB Assembly \(Original\) \(Page 1 of 1\)](#), page 10-3
[7340400-SC Main PCB Assembly Schematic \(Original\) \(Page 1 of 8\)](#), page 10-5
[7340401-AS Display/Keyboard PCB \(Page 1 of 1\)](#), page 10-13
[7340401-SC Display/Keyboard PCB Schematic \(Page 1 of 1\)](#), page 10-14
[7340402-AS Analog PCB Assembly \(Page 1 of 1\)](#), page 10-15
[7340525-AS Analog PCB with Diodes \(Page 1 of 1\)](#), page 10-16
[7340402-SC Analog PCB Schematic \(Page 1 of 3\)](#), page 10-17
[7340403-AS Incubator PCB Assembly \(Page 1 of 1 \)](#), page 10-20
[7340403-SC Incubator PCB Schematic \(Page 1 of 2\)](#), page 10-21
[7340406-AS Digital PCB Assembly \(Page 1 of 1\)](#), page 10-23
[7340406-SC Digital PCB Schematic \(Page 1 of 8\)](#), page 10-25

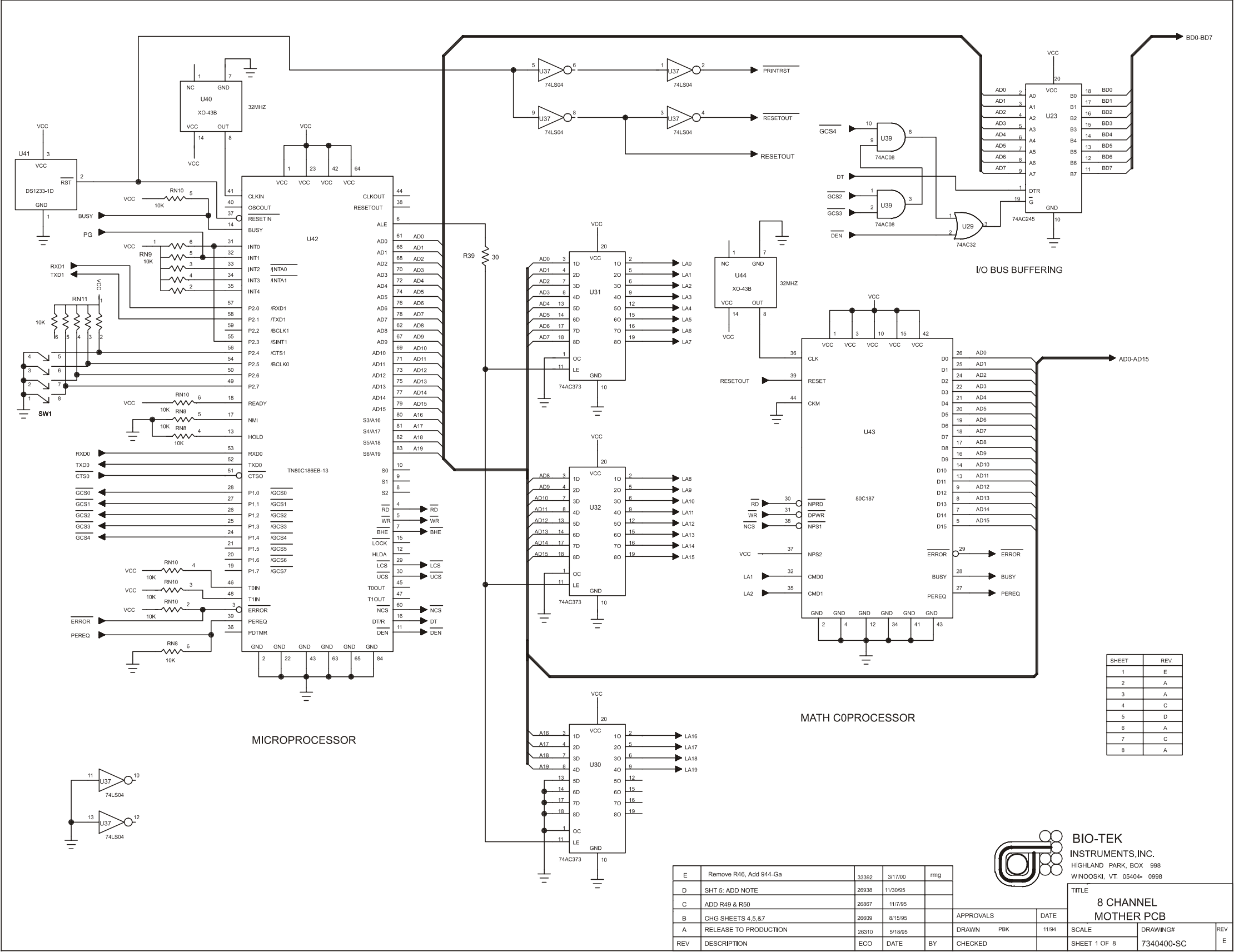


7340400-AS Main PCB Assembly (Original) (Page 1 of 1)

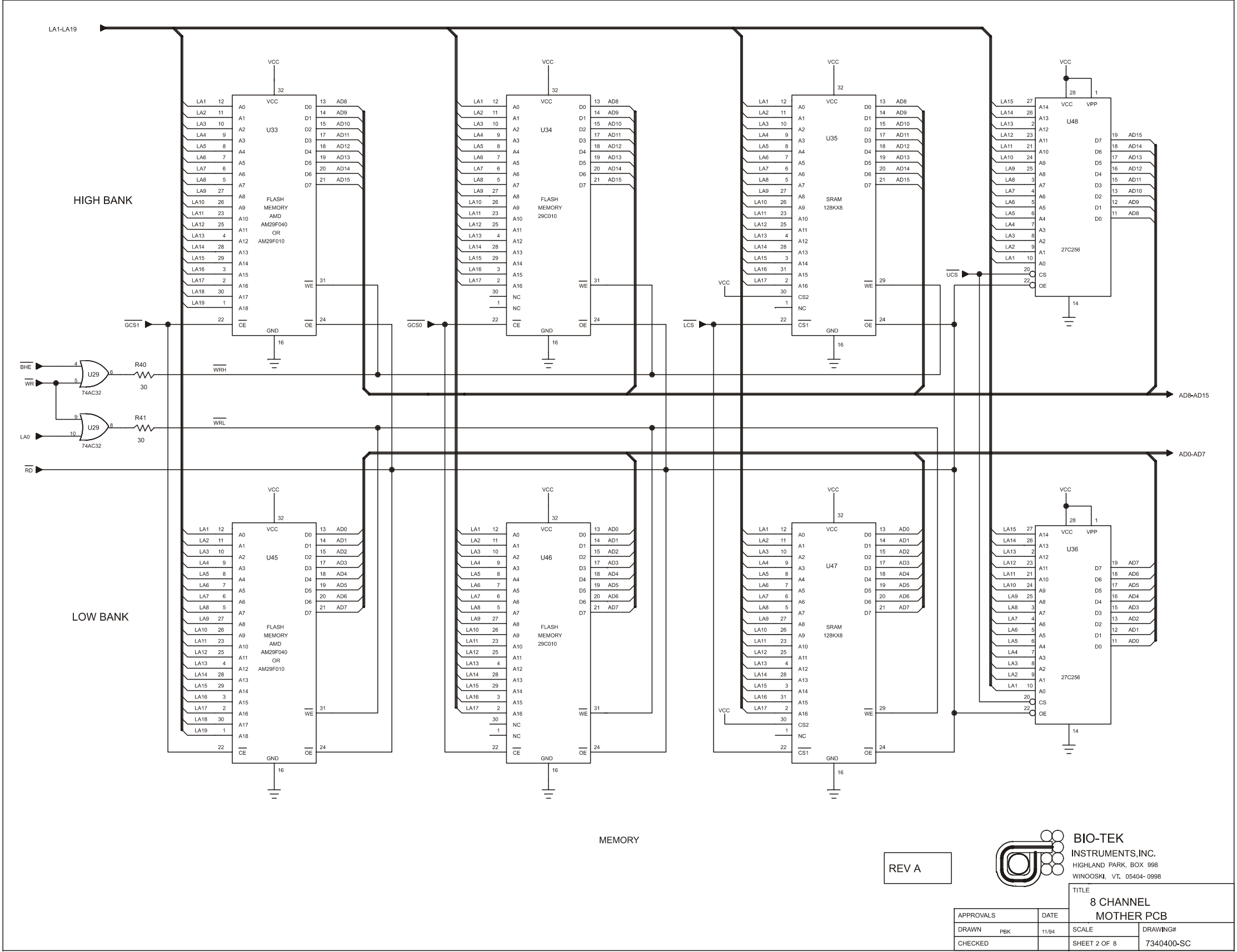
See [7340406-AS Digital PCB Assembly \(Page 1 of 1\)](#), page 10-23 for BOM

The following parts are added for the robotic version.

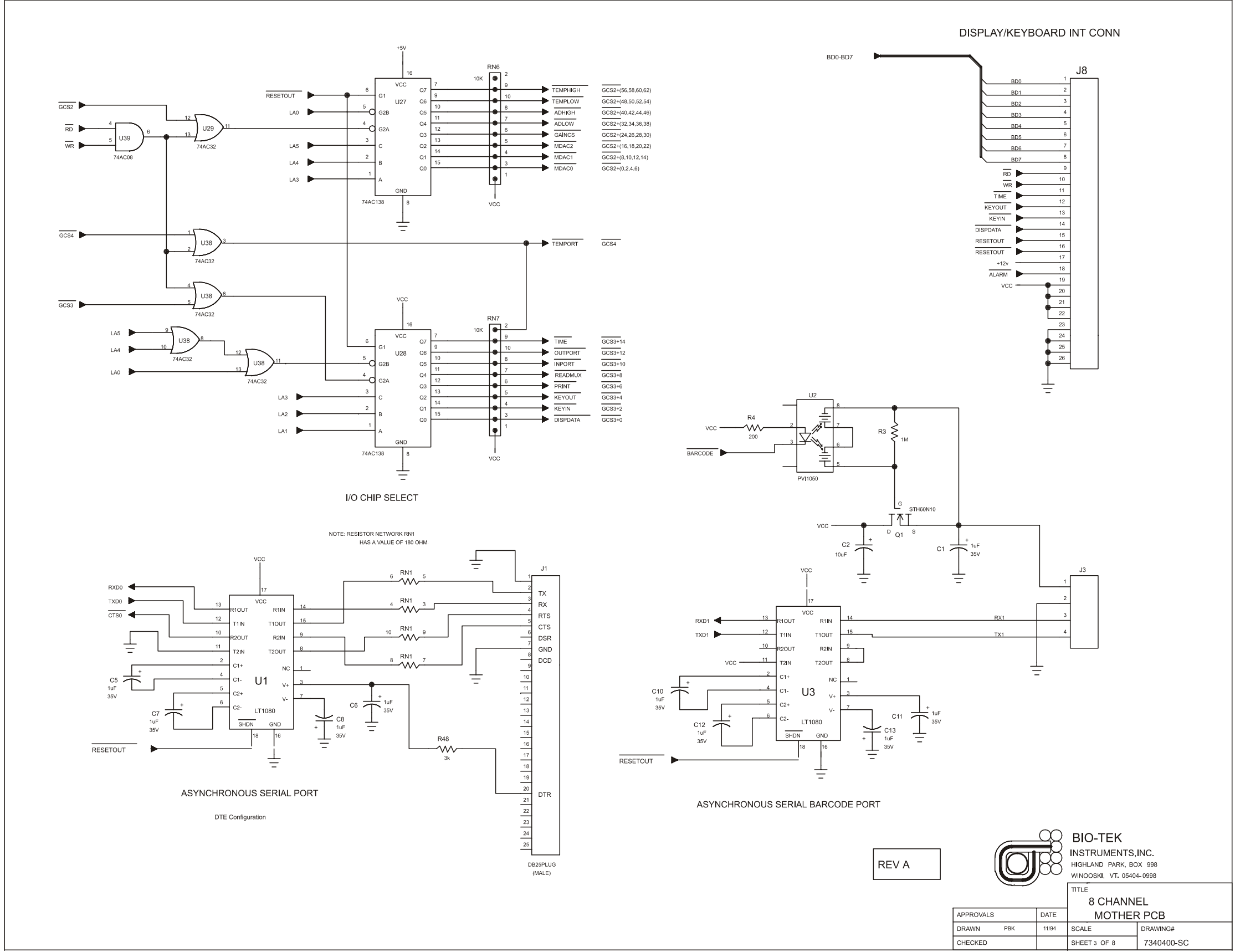
7340404 Main PCB with Robot Motor Drive Assembly rev H As of 10-12-01				
Item	Description	Rev	Qty	Remarks
28064	IC STEPPER MOTOR DRIVER	C	1	U15
29084	IC D/A DUAL 7 BIT	E	1	U24
32047	RES 1.000K OHM 1% 1/4W	B	2	R21,22
32085	RES 15.00K OHM 1% 1/4W	B	1	R31
32232	RES 200.00OHM 1% 1/4W	B	2	R5,6
38067	RES .65 OHM 1W 1%	B	4	R19,20,27,28
42319	HEDR 4-P .100 PCB MOUNT GOLD	A	1	J11
48225	LABEL WHITE .80 X .25	C	1	MARK WITH PCB PART NUMBER
7340400-SC	-MAIN PCB ASBY SCHEMATIC	E	0	DOCUMENT ONLY
7340406	DIGITAL PCB ASBY	E	1	
7340406-AS	-DIGITAL PCB ASBY	C	0	DOCUMENT ONLY
81004	CAP 100 UF 63V ELEC	B	1	C30
84039	CAP 820 PF 200V 10% X7R	A	3	C15,41,43
84054	CAP .0033UF FILM	A	1	C42



7340400-SC Main PCB Assembly Schematic (Original) (Page 1 of 8)

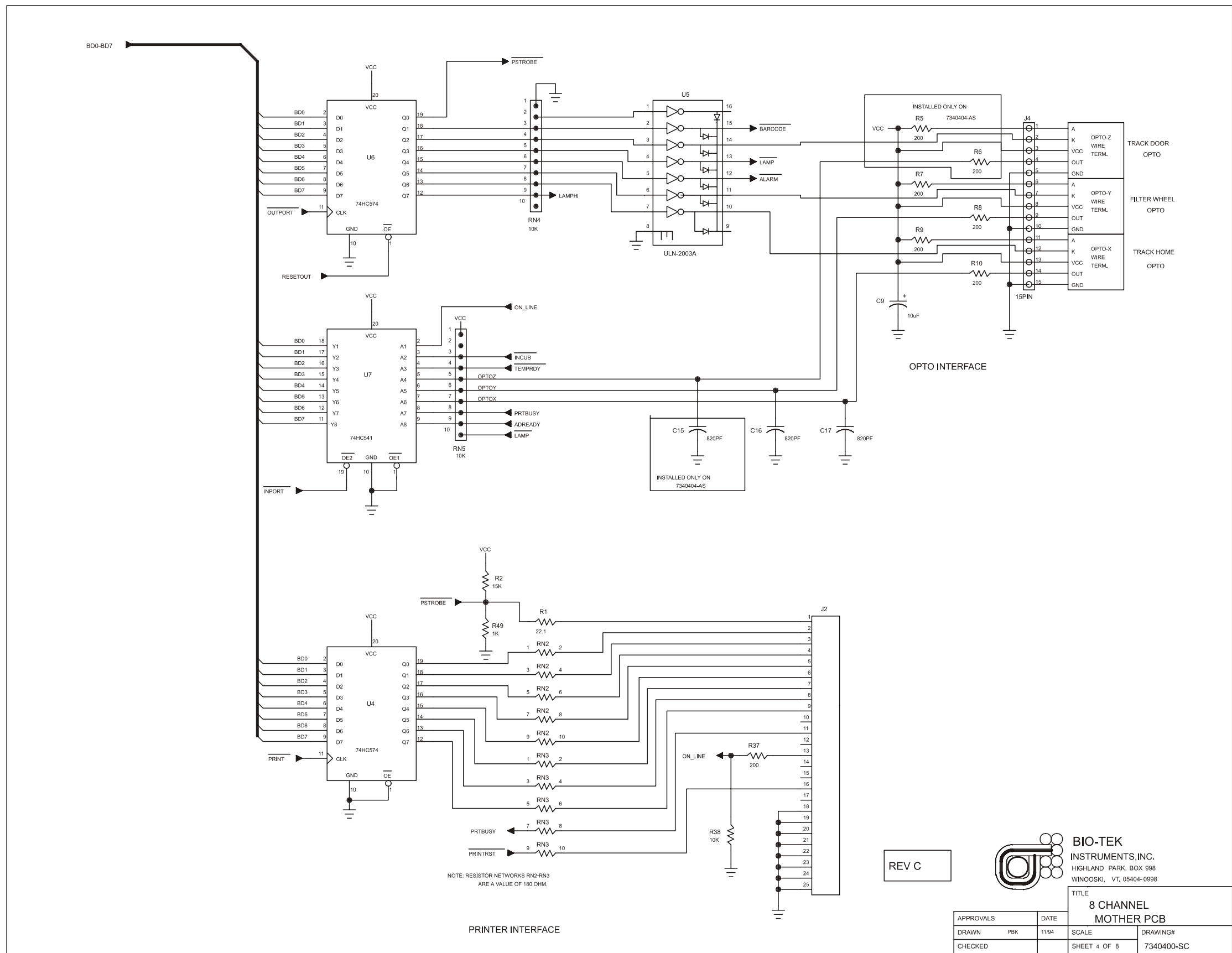


7340400-SC Main PCB Assembly Schematic (Original) (Page 2 of 8)

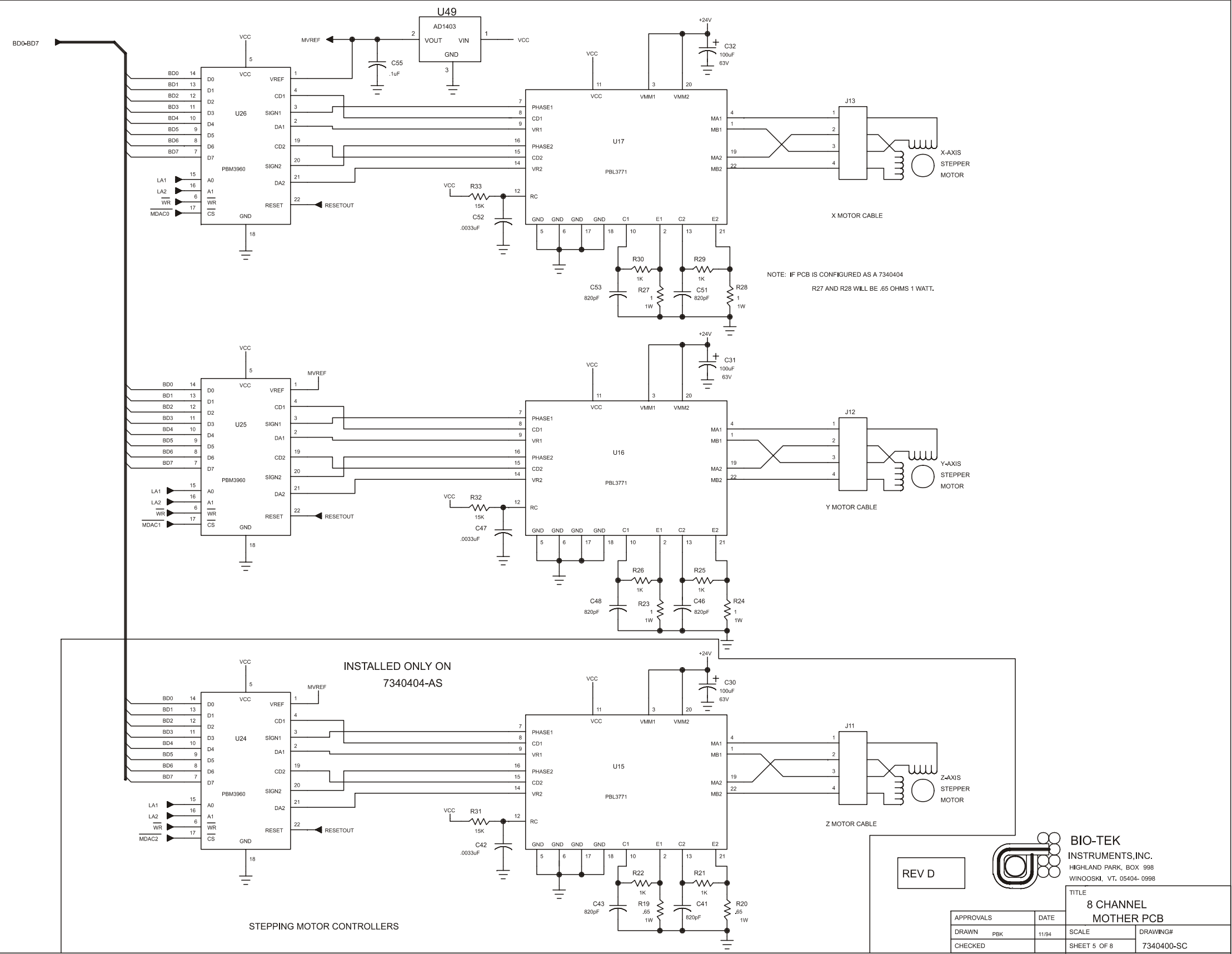


7340400-SC Main PCB Assembly Schematic (Original) (Page 3 of 8)

Front:
7340400-SC Main PCB Assembly Schematic (Original) (Page 3 of 8)
Back:
7340400-SC Main PCB Assembly Schematic (Original) (Page 4 of 8)

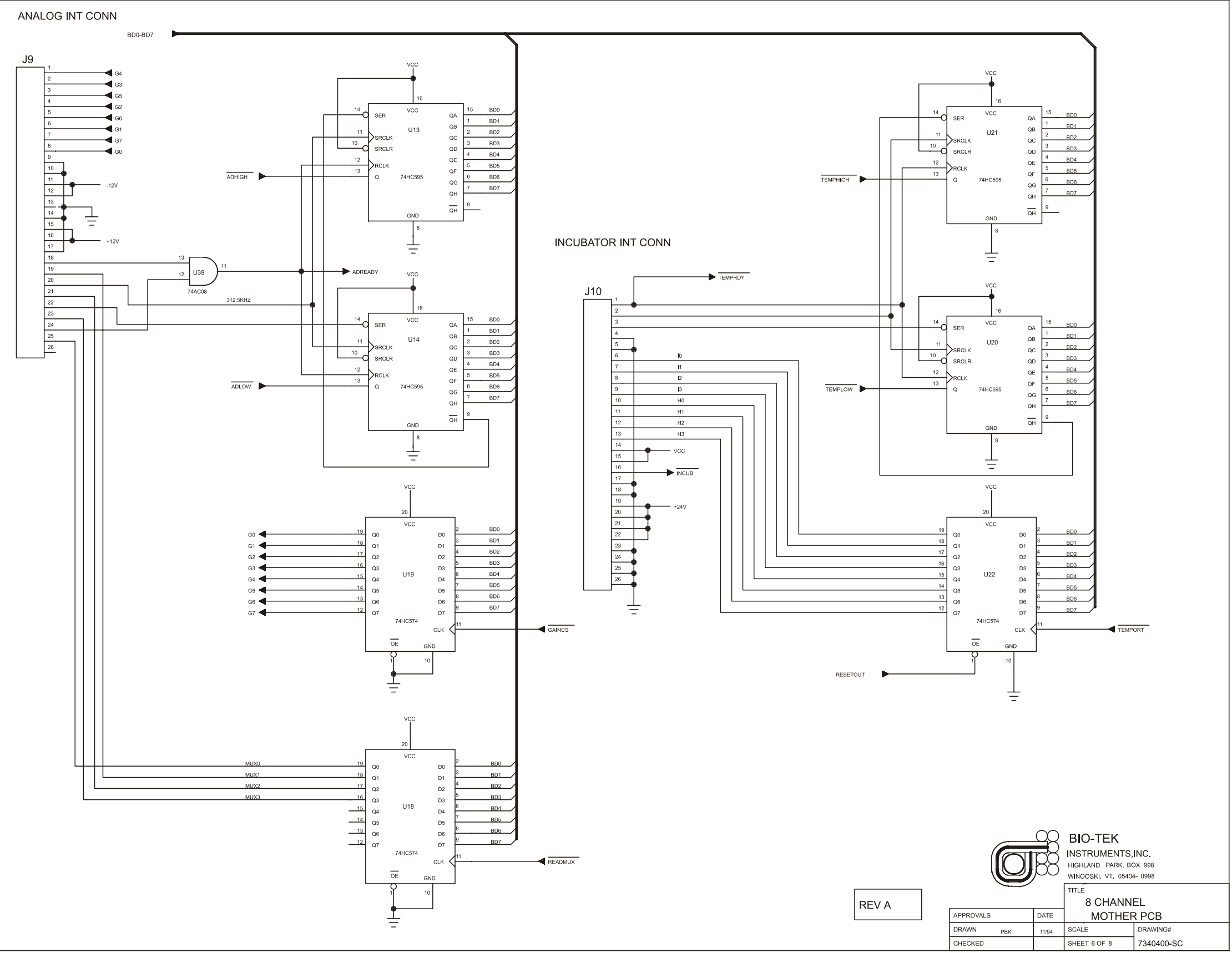


7340400-SC Main PCB Assembly Schematic (Original) (Page 4 of 8)

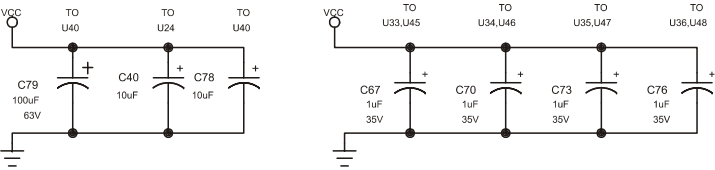
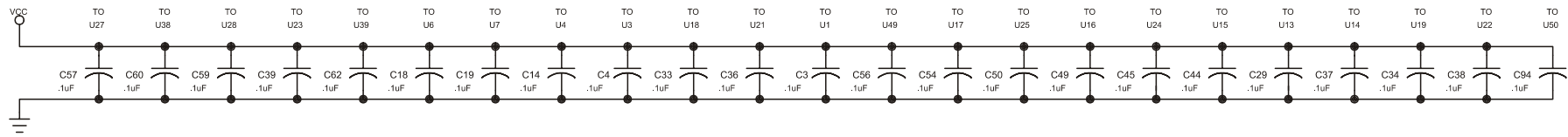
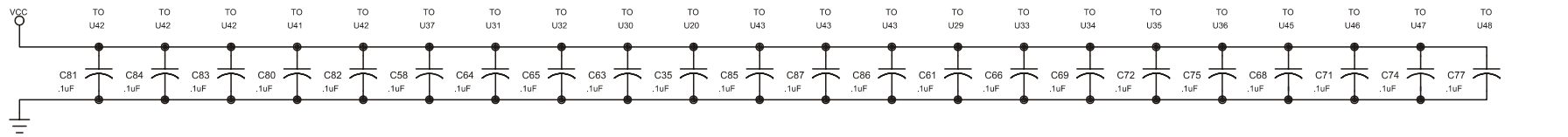


7340400-SC Main PCB Assembly Schematic (Original) (Page 5 of 8)

Front:
7340400-SC Main PCB Assembly Schematic (Original) (Page 5 of 8)
Back:
7340400-SC Main PCB Assembly Schematic (Original) (Page 6 of 8)



7340400-SC Main PCB Assembly Schematic (Original) (Page 6 of 8)



BYPASS CAPACITORS

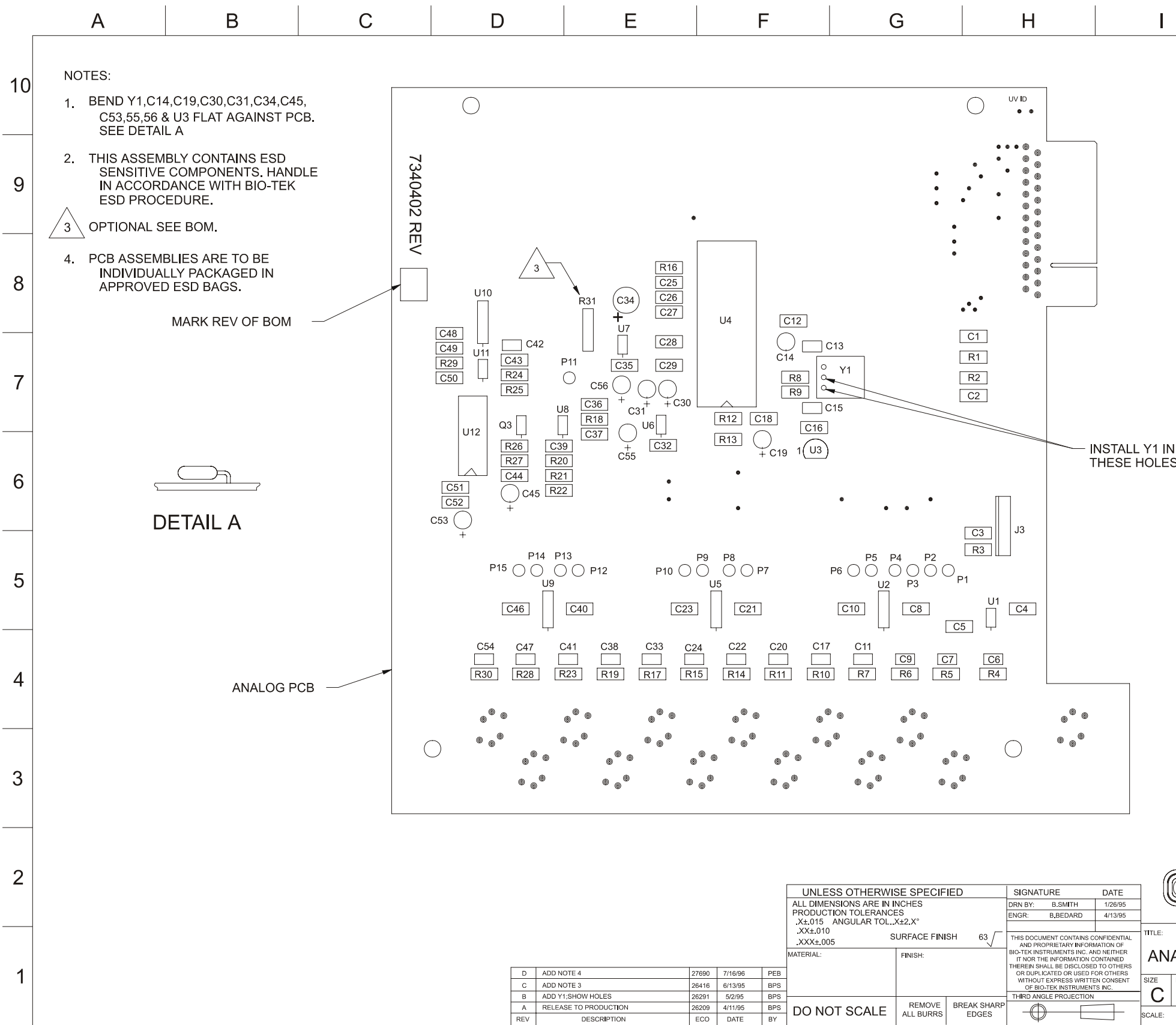
REV A



BIO-TEK
INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998

TITLE	
8 CHANNEL MOTHER PCB	
APPROVALS	DATE
DRAWN PBK	11/94
CHECKED	
SCALE	DRAWING#
SHEET 8 OF 8	7340400-SC

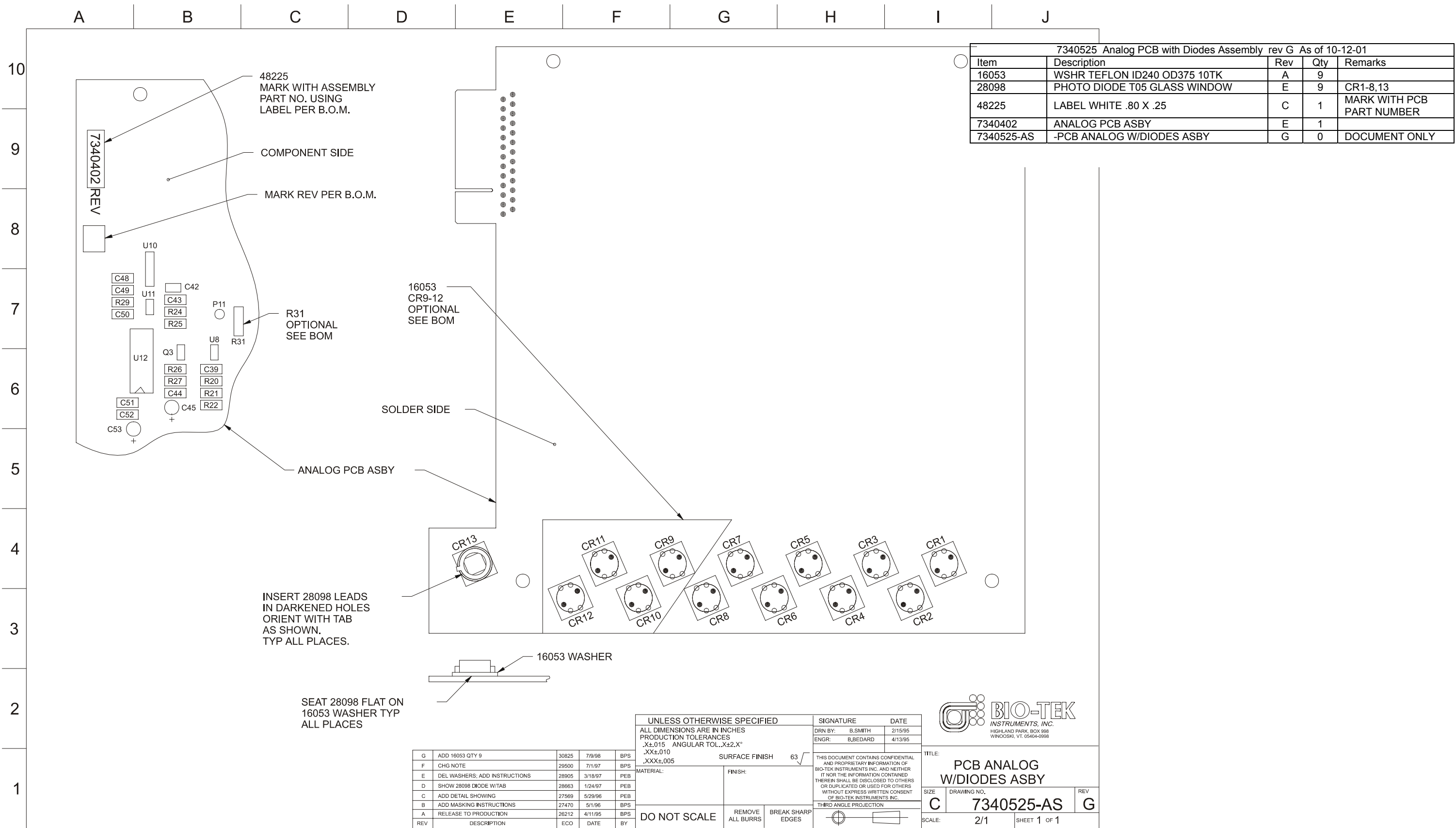
7340400-SC Main PCB Assembly Schematic (Original) (Page 8 of 8)



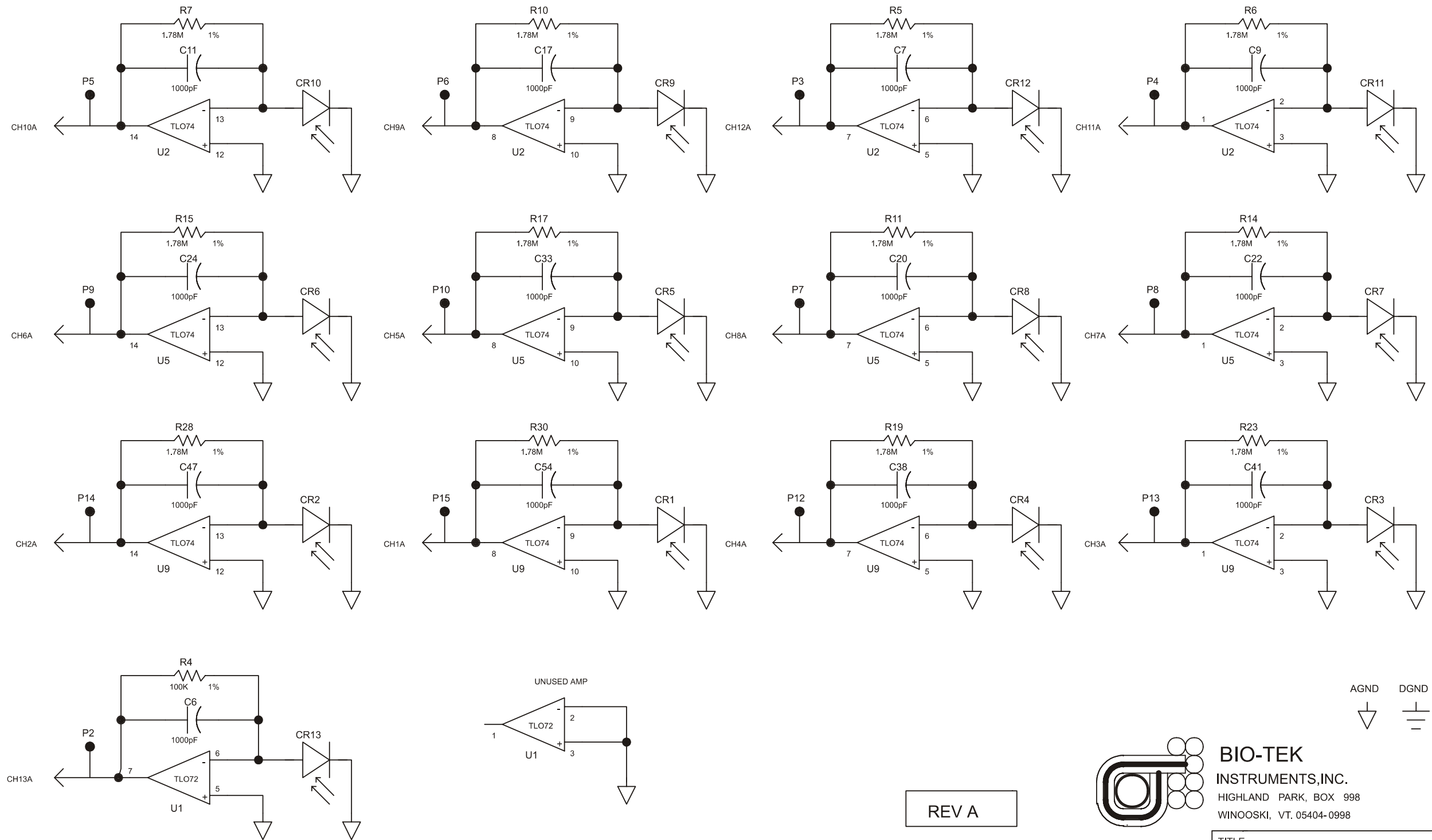
7340402 Analog PCB Assembly rev E As of 10-12-01				
Item	Description	Rev	Qty	Remarks
23015	IC 7524 MULTIPLYING DAC SO	B	1	U10
23020	IC 506 ANALOG MULTIPLEXER SO	A	1	U12
23058	VOLT REF 2.5V SO	A	1	Q3
25133	IC CS5102 A/D 16BIT	A	1	U4
25136	IC DS1233-10 ECONO RESET	A	1	U3
28079	IC -5V REGULATOR	A	1	U7
28080	IC +5V REGULATOR	A	1	U6
28119	IC TL072BCD S0-8 PKG	B	3	U1,8,11
28120	IC TLO74BCD S0-14 PKG	C	3	U2,5,9
37072	1.25 MHZ CERAMIC RESONATOR	B	1	Y1
38002	RES 10.0 OHM 1% SIZE 1206	B	4	R1,2,12,13
38003	RES 243 OHM 1% SIZE 1206	B	3	R16,20,22
38005	RES 1.00K OHM 1% SIZE 1206	D	5	R3,21,24,26,29
38006	RES 1.21K OHM 1% SIZE 1206	B	1	R18
38008	RES 10.0K OHM 1% SIZE 1206	B	1	R27
38010	RES 1.00M OHM 1% SIZE 1206	B	1	R8
38024	RES 1.78M OHM 1% SIZE 1206	A	12	R5-7,10,11,14,15,17,19,23,28,30
38025	RES 100K OHM 1% SIZE 1206	A	1	R4
38036	RES 5.62K OHM SIZE 1206	A	1	R9
38060	RES 464K OHM SIZE 1206	A	1	R25
42419	HEDR 5-P .100 LOK RTAN GOLD	B	1	J3
7340402-AS	-ANALOG PCB ASBY	D	0	DOCUMENT ONLY
7340402-SC	ANALOG PCB ASBY SCHEMATIC	A	0	DOCUMENT ONLY
7341402	ANALOG PCB	C	1	
82003	CAP 10 uF 25V TANT	C	1	C34
82005	CAP 1uF 35V TANT	E	8	C14,19,30,31,45,53,55,56
84041	CAP .1 UF 50V X7R SIZE 1206	A	28	C1-5,8,10,12,16,18,21,23,26,27-29,32,35-37,39,40,43,44,46,48,50,52
84043	CAP 100 PF 50V NPO SIZE 0805	B	3	C13,15,42
84046	CAP 1000 PF 50V NPO SIZE 1206	B	3	C25,49,51
84049	CAP .001 UF 50V 10%	A	13	C6,7,9,11,17,20,22,24,33,38,41,47,54

7340402-AS Analog PCB Assembly (Page 1 of 1)

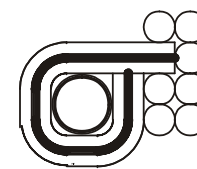
Front:
7340402-AS Analog PCB Assembly (Page 1 of 1)
7340402 Analog PCB Assembly BOM
Back:
7340525-AS Analog PCB with Diodes (Page 1 of 1)
7340525 Analog PCB with Diodes Assembly BOM



7340525-AS Analog PCB with Diodes (Page 1 of 1)



REV A

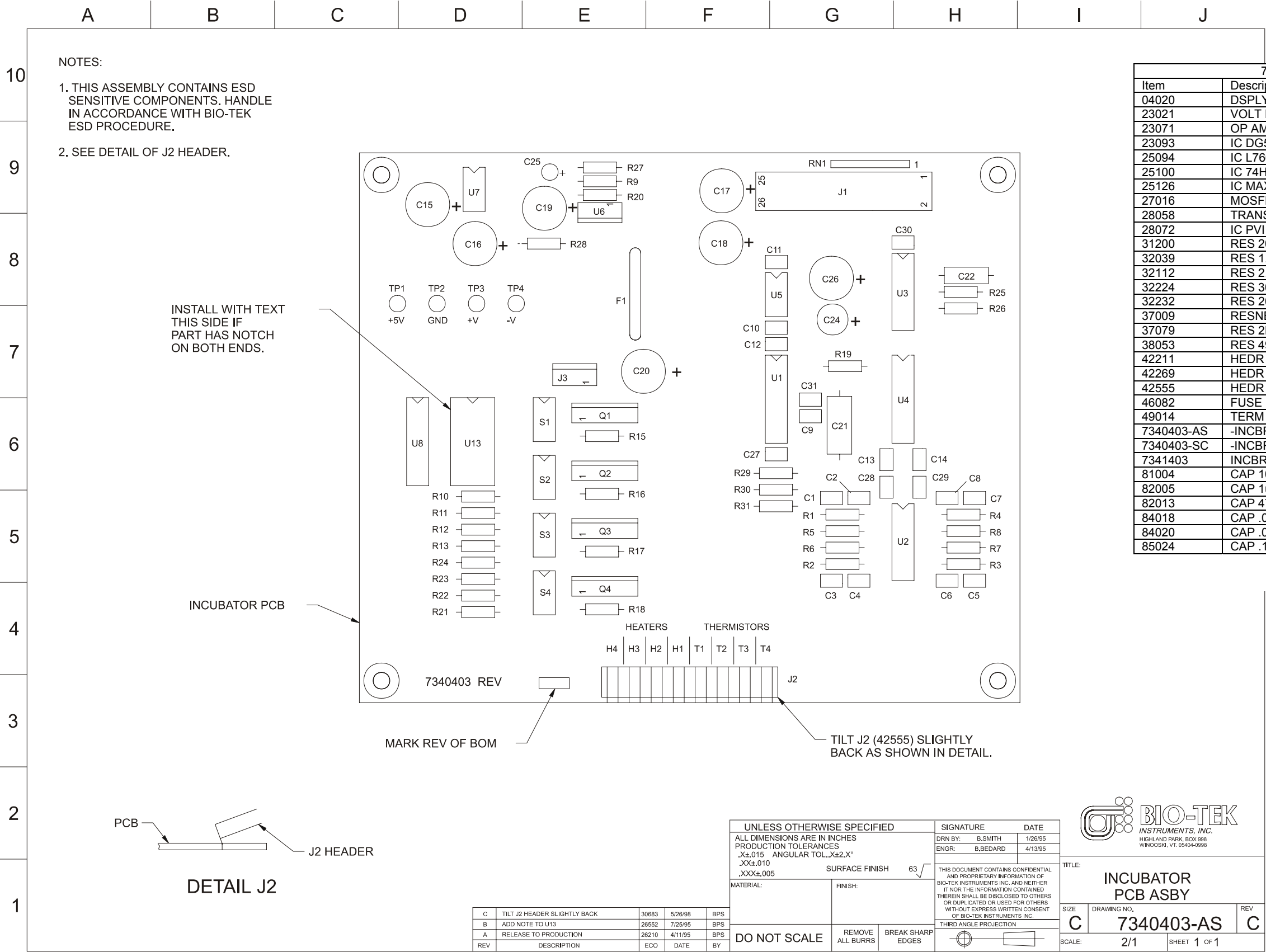


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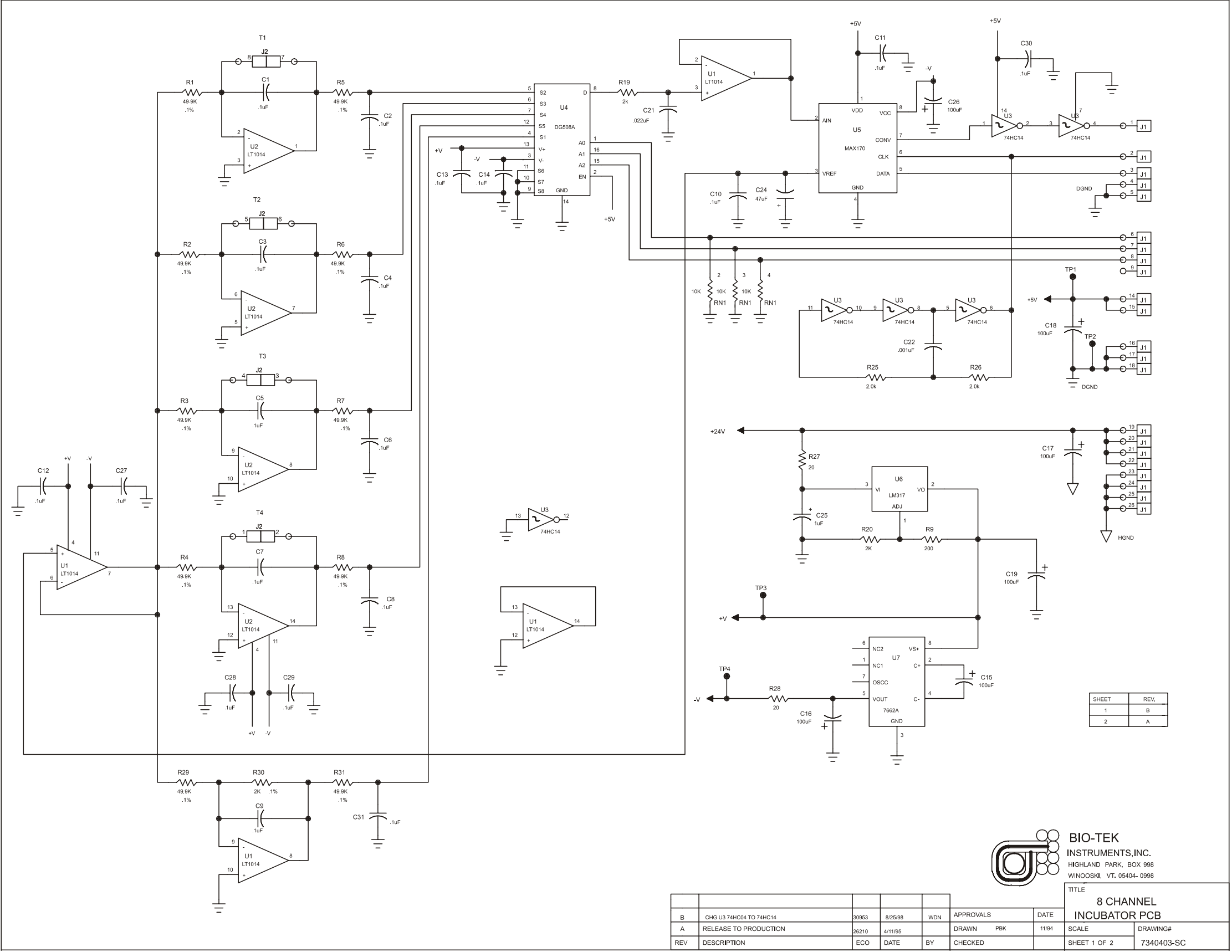
APPROVALS		DATE	TITLE	
DRAWN	SAW	10/94	ANALOG P.C. BOARD SCHEMATIC	
CHECKED			SCALE	DRAWING#
			SHEET 3 OF 3	7340402-SC

7340402-SC Analog PCB Schematic (Page 3 of 3)

Front:
7340402-SC Analog PCB Schematic (Page 3 of 3)
Back:
7340403-AS Incubator PCB Assembly (Page 1 of 1)
7340403 Incubator PCB Assembly BOM



7340403-AS Incubator PCB Assembly (Page 1 of 1)



7340403-SC Incubator PCB Schematic (Page 1 of 2)

Front:
7340403-SC Incubator PCB Schematic (Page 1 of 2)
Back:
7340403-SC Incubator PCB Schematic (Page 2 of 2)

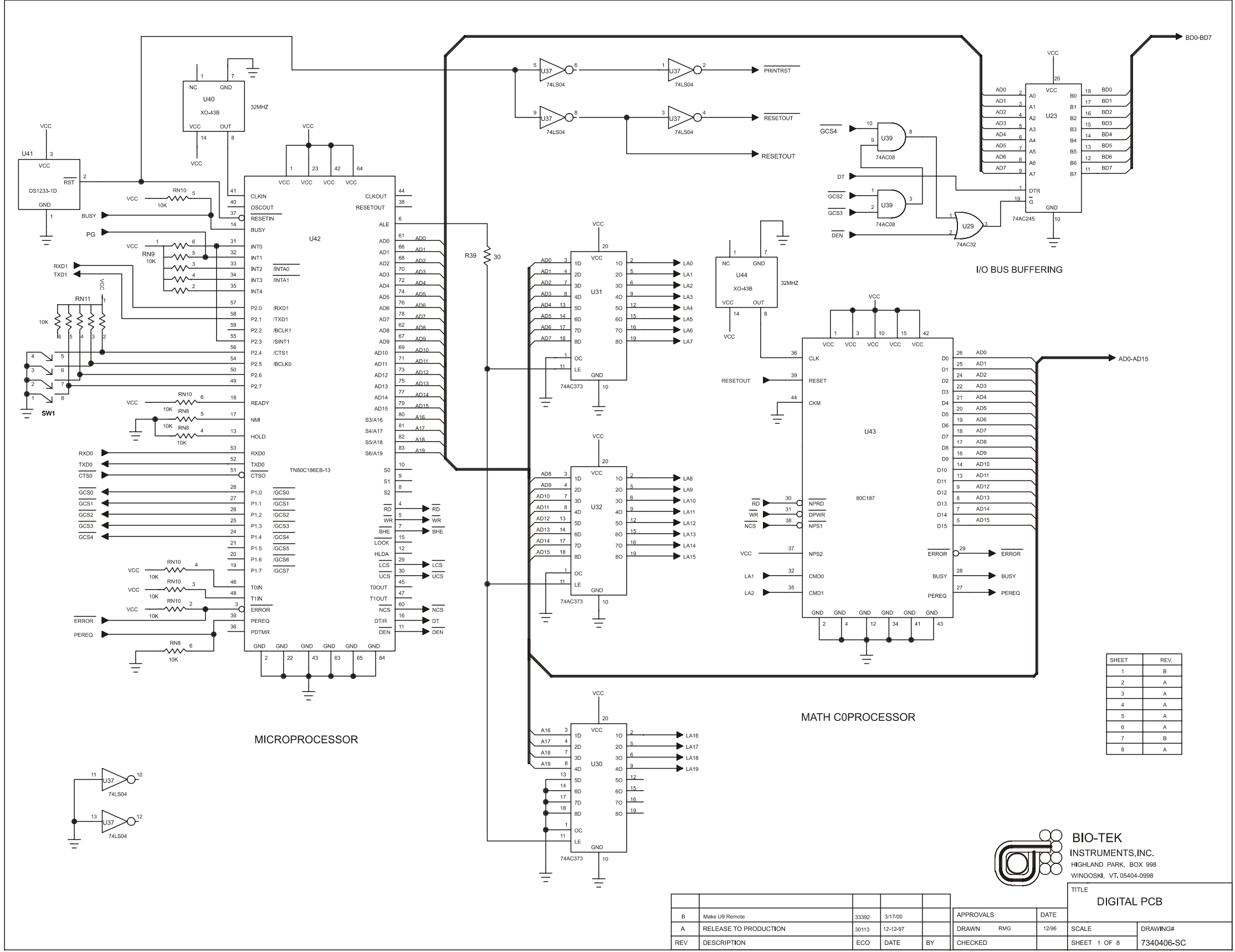


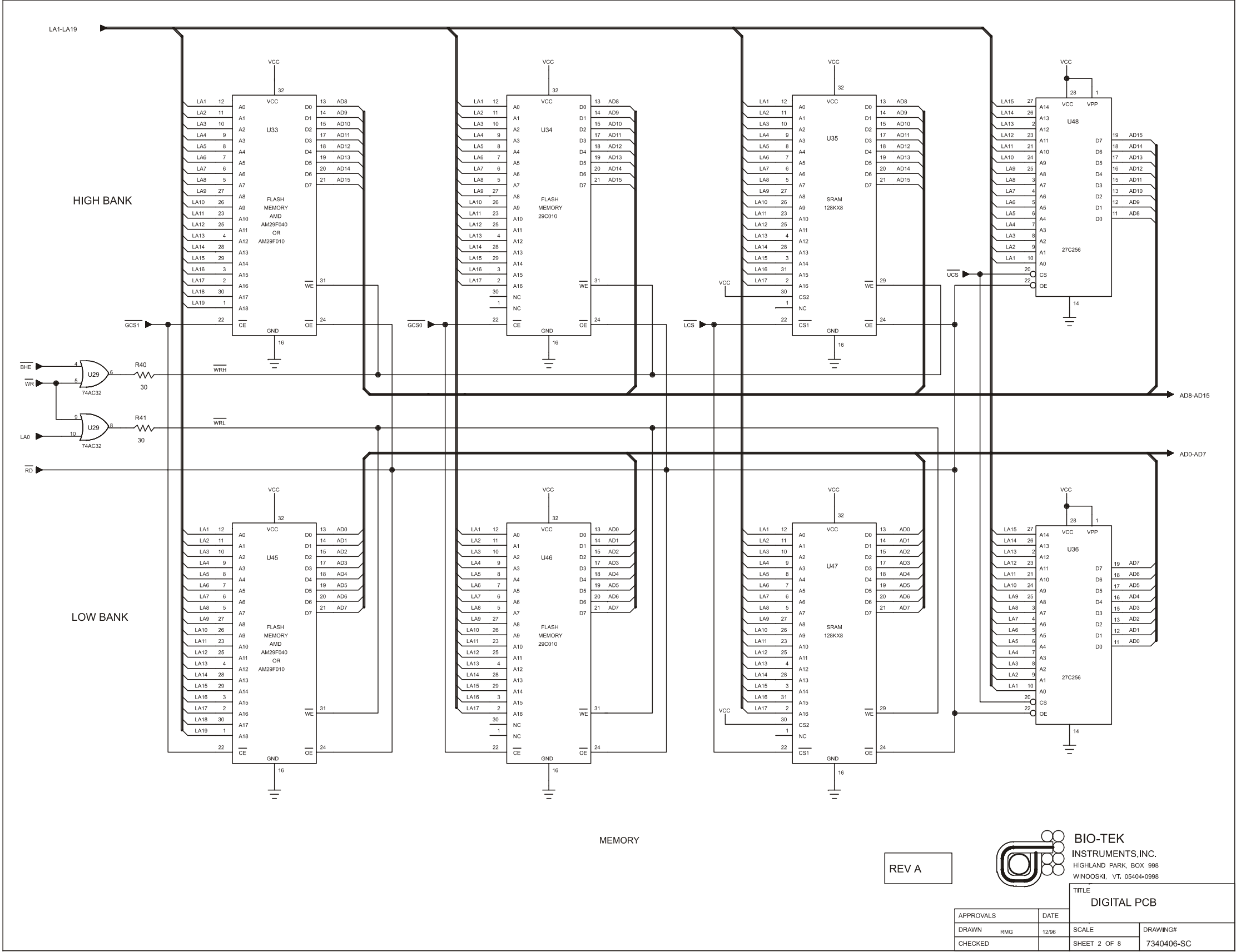
7340406 Digital PCB Assembly rev F As of 10-12-01 Page 1 of 2				
Item	Description	Rev	Qty	Remarks
12066	SCR PAN 4-40X3/8 PHILL SS	A	1	
15007	LOCKNUT 4-40 SS	A	1	
21007	DIODE MR751 6A	B	2	CR1,2
21010	DIODE IN5821 SCHOTTKY 30V 1/4W	B	3	CR4-6
23072	VOLT REG LM2575T	D	1	U11
23092	VOLT REG ADJ LM2576 SWITCHER	A	1	U10
25027	IC 74HC595 SHIFT REG 8BIT 3ST	B	4	U13,14,20,21
25051	IC 74LS04 HEX INVERTER	D	1	U37
25084	IC 74HC541 TS OCTAL BFR NONINV	E	1	U7
25086	IC 74HC574 OCTAL D FLIP-FLOP	C	5	U4,6,18,19,22
25106	IC 74AC245 OCTAL TRANSCEIVER	F	1	U23
25107	IC 74AC32 QUAD 2-INPUT OR GATE	F	2	U29,38
25108	IC LT1017CN8 COMPARATOR	A	1	U50
25114	IC LT1080 RS232 DRU/RECEIVER	A	1	U1
25130	IC 74AC373 OCTAL LATCH	A	3	U30-32
25131	IC 74AC08 QUAD 2-INPUT AND	B	1	U39
25132	IC 74AC138 1 OF 8 DECODER	B	2	U27,28
25135	IC 80C186-20 UP PLCC	B	1	[U42]
25136	IC DS1233-10 ECONO RESET	A	1	U41
26008	TRANSISTOR 2N2222 BJT NPN	D	1	Q3
26021	TRANSORB 36V 1.5KE36A	A	1	CR3
27013	TRANSISTOR 2N7008RLRA N-CH	F	1	Q2
28004	VOLT REF 2.5	C	1	U49
28043	VOLT REF 1.2 LT1004 +/-4MV	B	1	CR7
28058	TRANS ARRAY 2003 DARL 5V	B	1	U5
28064	IC STEPPER MOTOR DRIVER	C	2	U16,17
28121	IC LT1054 VOLTAGE CONVERTER	B	1	U8
29084	IC D/A DUAL 7 BIT	E	2	U25,26
29106	IC 128KX8 CMOS STATIC RAM	M	2	U35,47
29132	IC FLASH MEM 128KX8	G	2	U34,46
29142	IC AM29F040-120JC	C	2	[U33,45]
31300	RES 30.0 OHM 5% 1/4W	B	3	R39-41
31302	RES 3.0K OHM 5% 1/4W	B	1	R48
32042	RES 10.00K OHM 1% 1/4W	B	2	R38,47
32047	RES 1.000K OHM 1% 1/4W	B	6	R18,25,26,29,30,49
32065	RES 21.00K OHM 1% 1/4W	B	1	R13
32085	RES 15.00K OHM 1% 1/4W	B	3	R2,32,33
32112	RES 2.00K OHM 1% 1/4W	B	1	R45
32126	RES 1.870K OHM 1% 1/4W	B	1	R16
32129	RES 2.49K OHM 1% 1/4W	B	1	R11
32146	RES 10.70K OHM 1% 1/4W	B	1	R12
32158	RES 2.49M OHM 1% 1/4W	D	1	R44
32195	RES 22.10 OHM 1% 1/4W	B	1	R1
32232	RES 200.00OHM 1% 1/4W	B	6	R7-10,15,37
32296	RES 3.32K 1% 1/4W	B	1	R17
33047	RES 1.00 OHM 1% 1W	C	4	R23,24,27,28
33074	RES 68 OHM 5% 1/2W	G	1	R50
37002	RESNET 10K OHM 5R 6P SIP	B	4	RN8-11
37007	RESNET 180 OHM 5R 10P SIP	B	3	RN1-3
37046	RESNET 10K SIP 10PIN 9RES 5%	A	4	RN4-7
37094	RES 10.00K OHM .1% 1/4W 5PPM	B	1	R43
38063	RES 29.4K .1% 1/4W	C	1	R42
42141	HEDR 15-P .100 LOK	B	1	J4
42211	HEDR 3-P .100 CTR LOK GOLD	B	1	J5
42225	HEDR 3-P .156 LOK	A	2	J6,7

7340406 Digital PCB Assembly rev F As of 10-12-01 Page 2 of 2				
Item	Description	Rev	Qty	Remarks
42269	HEDR 26P DUAL ROW 0.100	B	3	J8-10
42319	HEDR 4-P .100 PCB MOUNT GOLD	A	2	J12-13
42556	CONN 25S DSUB PCB MNT STR F	A	1	[J2]
42557	CONN 25P DSUB PCB MNT STR M	A	1	[J1]
49014	TERM PCB	B	6	TP1-6
49090	HEATSINK PC MOUNT TO-220	A	1	
49149	SOCKET IC 28-PIN DIP	B	2	SOCKET FOR U36,48
49478	SOCKET 84-PIN PLCC	B	1	SOCKET FOR U42
49743	CRYSTAL CLOCK OSC 32 MHZ	B	1	U40
49878	SOCKET 32 PIN PLCC	B	2	SOCKET FOR U33,U45
54005	SW DIP 4-SW SIDE-ACT	A	1	[SW1]
62027	FILTER EMI SUPPR .5-1GHZ	A	1	U12
63018	INDUCTOR 220UH	A	2	L1,2
71027	WIRE BUS 20 AWG	A	0.01	A/R
7330200	FIRMWARE ASBY	C	1	[LOW IN U36] [HIGH IN U48]
7340400-TP	MAIN PCB ASBY	F	0	DOCUMENT ONLY
7340406-AS	-DIGITAL PCB ASBY	C	0	DOCUMENT ONLY
7340406-SC	-DIGITAL PCB SCHEMATIC	B	0	DOCUMENT ONLY
7341406	DIGITAL PCB	B	1	
81004	CAP 100 UF 63V ELEC	B	7	C21,22,25,28,31,32,79
81022	CAP 470 UF 35V ELEC VERTICAL	D	2	C24,27
81027	CAP 10000UF ELECTROLYTIC	A	2	C91, [C92]
82003	CAP 10 uF 25V TANT	C	4	C9,40,78,90
82005	CAP 1uF 35V TANT	E	9	C5-8,23,67,70,73,76
84039	CAP 820 PF 200V 10% X7R	A	6	C16,17,46,48,51,53
84054	CAP .0033UF FILM	A	2	C47,52
85002	CAP .01 uF 100V 1%	G	1	C89
85024	CAP .1UF 50V CER	B	46	C3,4,14,18,19,29,33-39,44,45,49,50,54-66,68,69,71,72,74,75,77,80-87,94
85025	CAP 6800UF 50VOLT	A	1	C26
86004	CAP 100UF 25V LOW ESR	A	1	C93
9440500	CABLE 3-PIN .100 SPACING 22GA	E	1	[U9] CABLE 944 GA

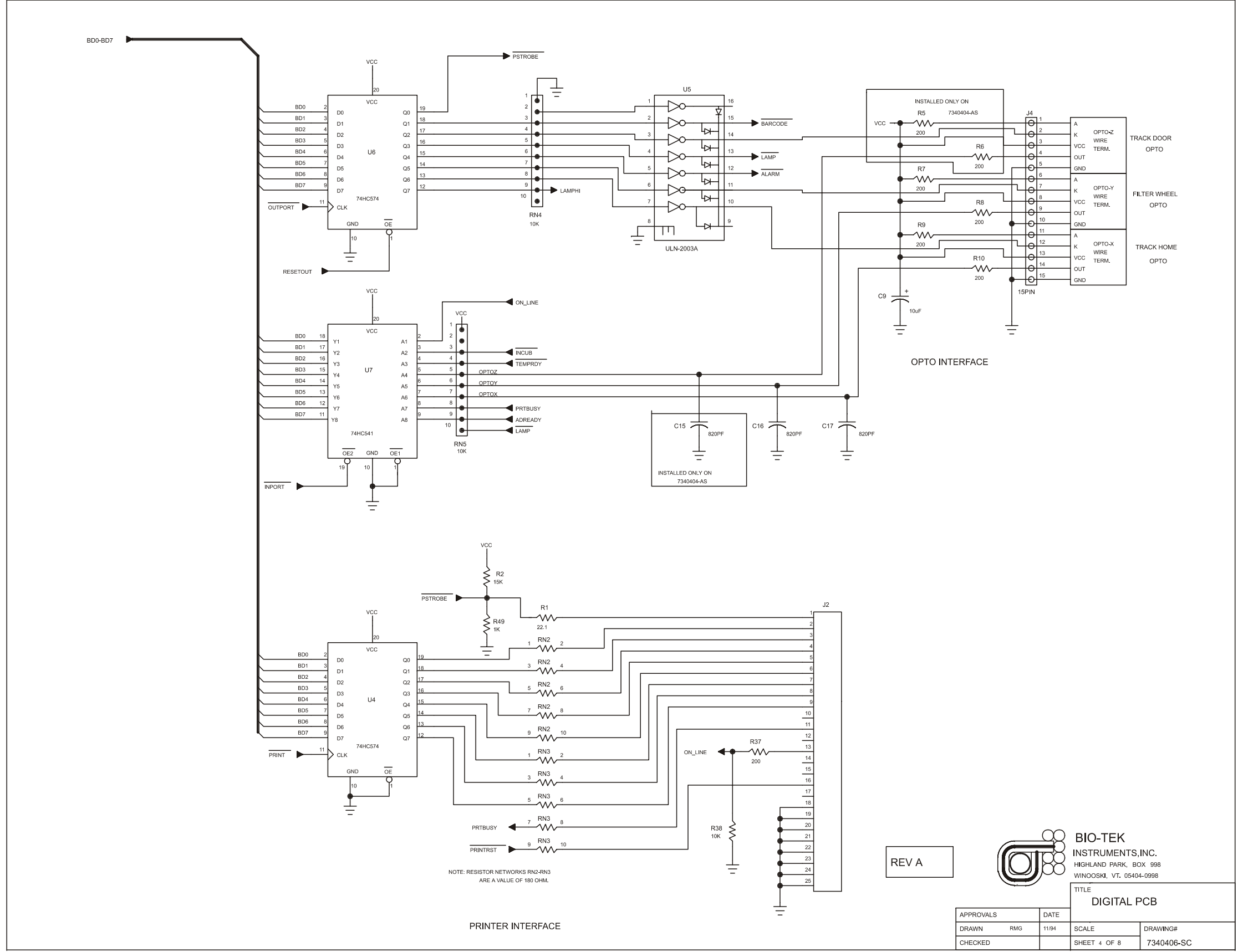
The following parts are added for the robotic version.

7340404 Main PCB with Robot Motor Drive Assembly rev H As of 8-27-01				
Item	Description	Rev	Qty	Remarks
28064	IC STEPPER MOTOR DRIVER	C	1	U15
29084	IC D/A DUAL 7 BIT	E	1	U24
32047	RES 1.000K OHM 1% 1/4W	B	2	R21,22
32085	RES 15.00K OHM 1% 1/4W	B	1	R31
32232	RES 200.00OHM 1% 1/4W	B	2	R5,6
38067	RES .65 OHM 1W 1%	B	4	R19,20,27,28
42319	HEDR 4-P .100 PCB MOUNT GOLD	A	1	J11
48225	LABEL WHITE .80 X .25	C	1	MARK WITH PCB PART NUMBER
7340400-SC	-MAIN PCB ASBY SCHEMATIC	E	0	DOCUMENT ONLY
7340406	DIGITAL PCB ASBY	E	1	
7340406-AS	-DIGITAL PCB ASBY	C	0	DOCUMENT ONLY
81004	CAP 100 UF 63V ELEC	B	1	C30
84039	CAP 820 PF 200V 10% X7R	A	3	C15,41,43
84054	CAP .0033UF FILM	A	1	C42

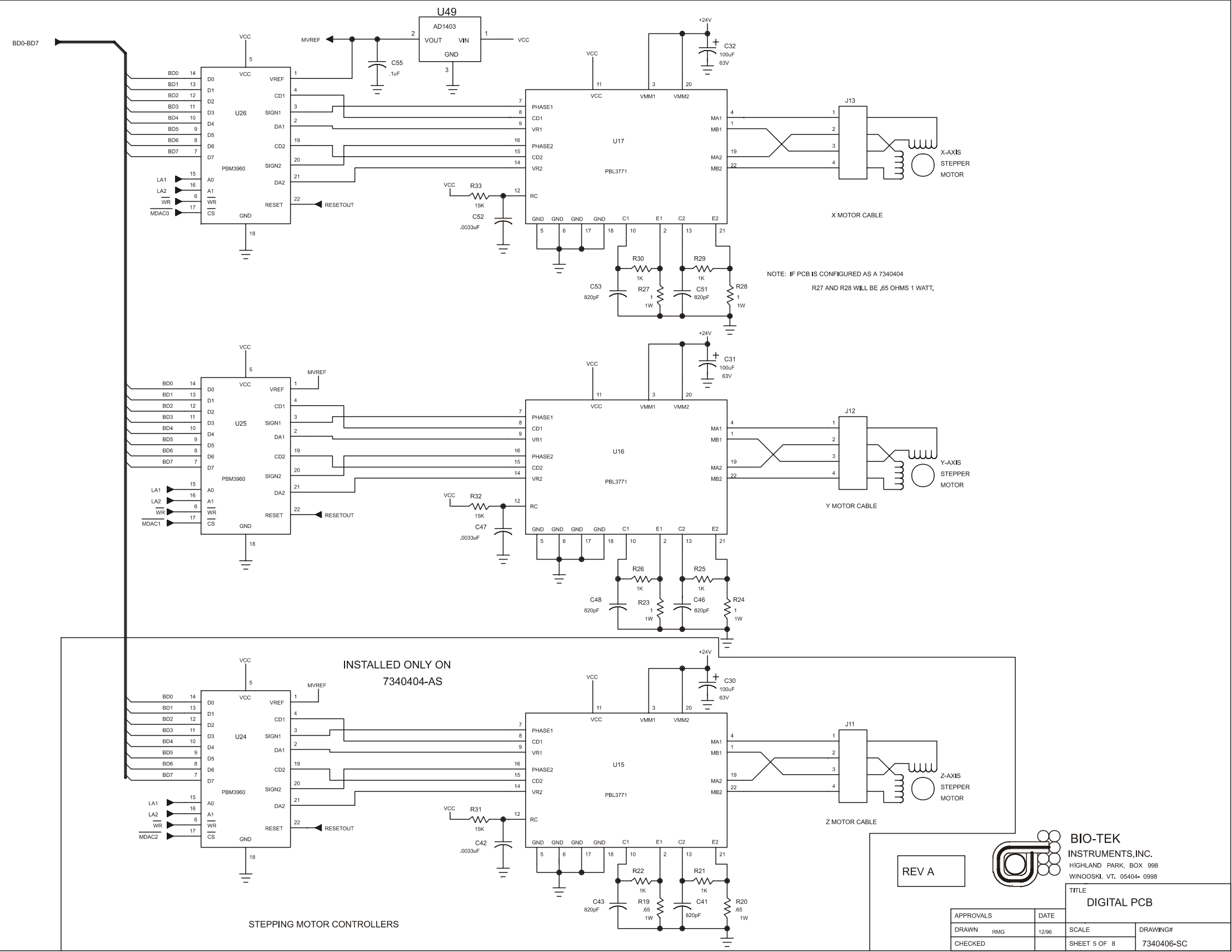




7340406-SC Digital PCB Schematic (Page 2 of 8)

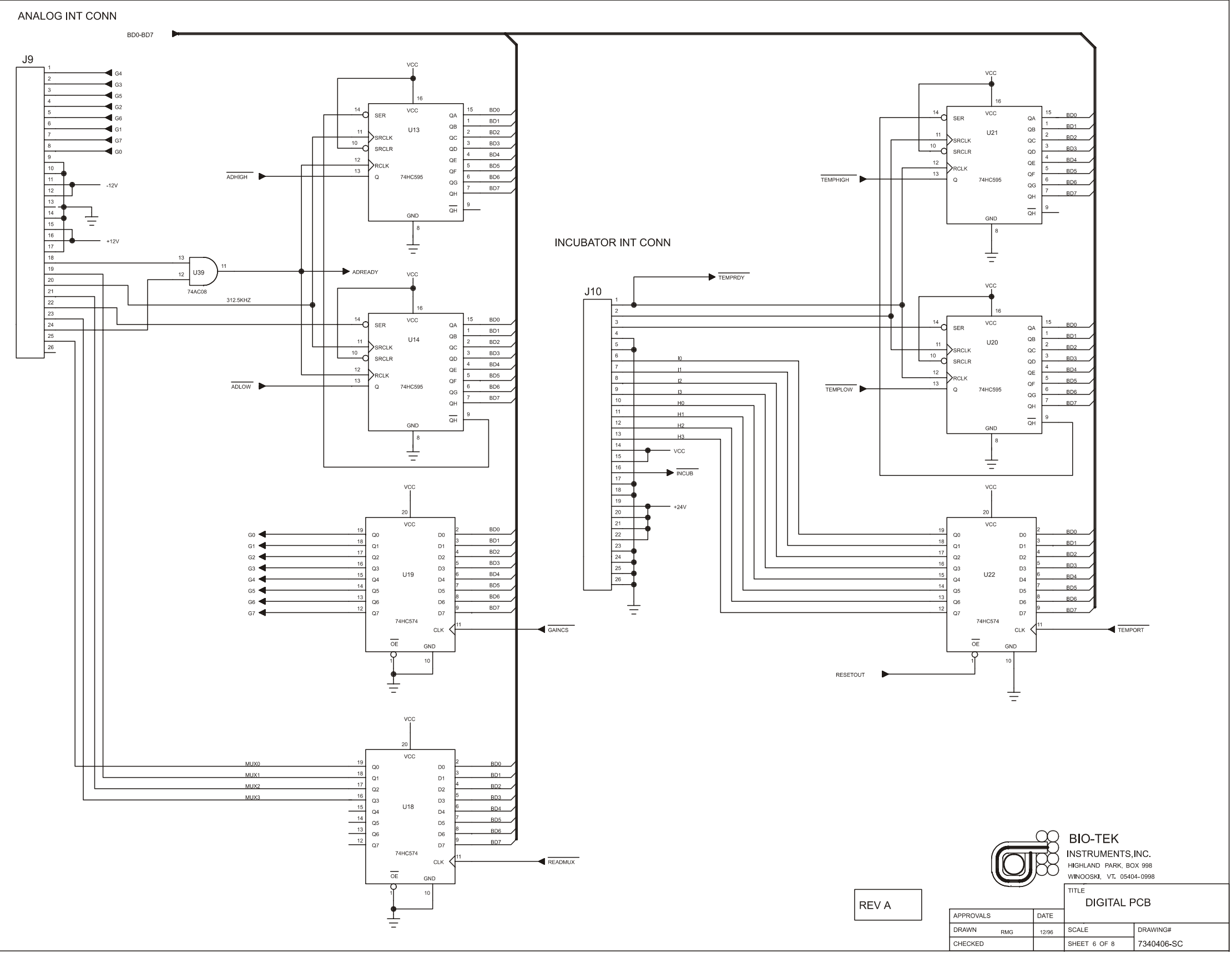


7340406-SC Digital PCB Schematic (Page 4 of 8)

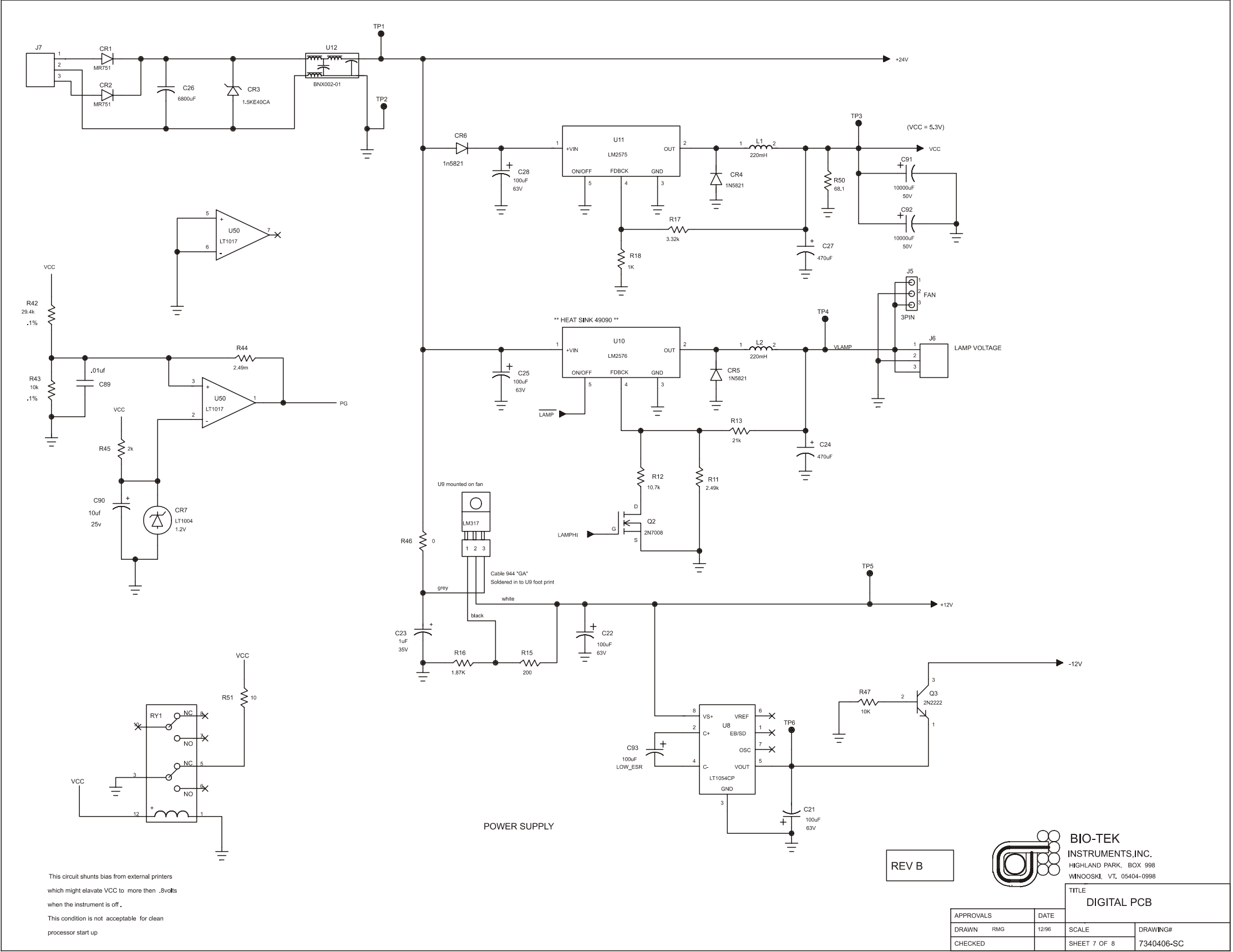


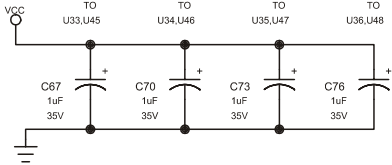
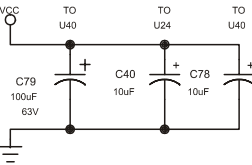
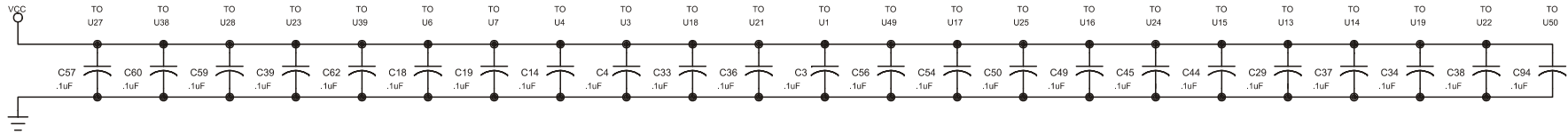
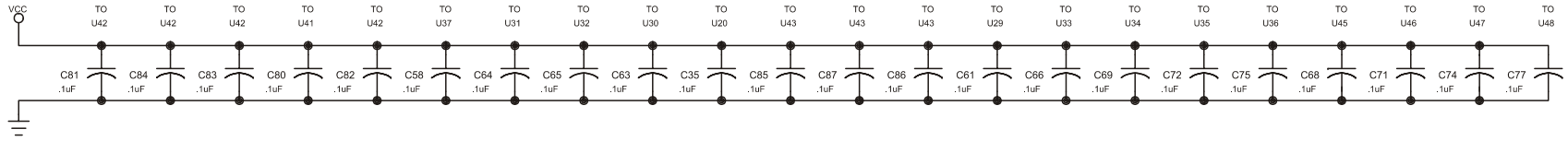
7340406-SC Digital PCB Schematic (Page 5 of 8)

Front:
7340406-SC Digital PCB Schematic (Page 5 of 8)
Back:
7340406-SC Digital PCB Schematic (Page 6 of 8)



7340406-SC Digital PCB Schematic (Page 6 of 8)





BYPASS CAPACITORS

REV A



BIO-TEK
INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
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APPROVALS		DATE	TITLE	
DRAWN RMG		12/96	DIGITAL PCB	
CHECKED			SCALE	DRAWING#
			SHEET 8 OF 8	7340406-SC

Recommended Service Parts

Item	Description
04018	LCD 2X24 SUPERTWIST DISPLAY
28098	PHOTO DIODE T05 GLASS WINDOW
29107	OPTICAL SENSOR OPAQUE WINDOW
3100108	TRANSFORMER CUSTOM 310
3100114	GASKET NEOPREAN 310
3100340	310 FILTER ASBY 340NM
3100405	310 FILTER ASBY 405NM
3100450	310 FILTER ASBY 450NM
3100490	310 FILTER ASBY 490NM
3100630	310 FILTER ASBY 630NM
3110508	MOLDED FILTER WHEEL W/ MAGNET
3112001	MOLDED FILTER WHEEL
3122037	PLUG FILTER WHEEL
3400508	LAMP 12V/20W HALOGEN WITHOUT UV BLOCKING LENS
3402000	LENS, BICONVEX BK7
3402001	LENS CONDENSER BK7
3402002	IR REFLECTING GLASS
3402004	LENS, PLASTIC, UV
41022	MOTOR PULLEY
41040	BELT TIMING 290T 3/16W D
46024	FUSE 1.5A 1" x 1/4"
46038	FUSE 0.63A 5x20mm
47049	BATTERY LITHIUM, 3.0V
47050	BATTERY HOLDER 3V LITH COIN
49049	CLIP, SPRING .560ID .025TK
49493	SPRING COIL
49588	FLAT CABLE MNT W/OCLAMP 1 1/4"
49748	FSTNR 8-32X3/8 BLACK SLOT (Top Case Mounting Screws)
54005	SW DIP 4-SW SIDE-ACT
56014	THERMOSTAT 60 DEGREES C TO220
62018	THERMISTER, 10K 1% W/33" WIRE
62027	FILTER EMI SUPPR .5-1GHZ
65020	BUZZER 3-16V PIEZO
68001	MOTOR STEPPER 5V DC 5:1
68019	MOTOR STEPER SIZE 17 SGL SFT
71072	CABLE, FOR PRINTER, IBMPC 6FT
7120576	OPTO SHORT LEAD ASBY
7120595	IDLER PULLEY ASBY

Item	Description
7340024	SERVICE KIT POWER SUPPLY RETROFIT
7340203	ASSAY CONFIGURATION FILES
7340202	BASECODE FIRMWARE ASBY
7331023	OVRLY KEYBOARD READER
7340401	DISPLAY/KEYBRD PCB ASBY
7340403	INCBR PCB ASBY
7340406S	DIGITAL PCB ASBY
7340501	CABLE ANALOG INT ASBY
7340502	CABLE DISPLAY KEYBOARD ASBY
7340503	CABLE POWER INPUT ASBY
7340504	CABLE FILTER WHEEL MOTOR ASBY
7340505	CABLE OPTO EXTENSION ASBY
7340506	CABLE LAMP ASBY
7340507	CABLE THERMISTOR ASBY
7340509	CABLE INCUBATOR INT ASBY
7340510	CABLE MOTOR EXTENSION ASBY
7340519	CABLE TRACK HEATER #1
7340520	CABLE TRACK HEATER #2
7340521	CABLE TRACK HEATER #3
7340522	CABLE TRACK THERMISTAT
7340525	PCB ANALOG W/DIODES ASBY
7340538	CABLE RS232 DB9F TO DB25F
7340539S	SERVICE ROBOTIC MOTOR ASSEMBLY
7341000	MANUAL ELX808 OPERATORS
7341002	OVRLY REAR
7341011	OVERLAY 808 FRONT
7341013	OVERLAY FRONT 808IU
7341020	OVRLY FRONT EL808 PURPLE
7342000	CASE TOP
7342002	FIBER OPTIC SPRAY 380NM
7342001	LID TOP CASE
7342004	COVER BOTTOM
7342005	CARRIER MICROPLATE
7342013	BRACKET PCB MOUNTING
7342024	BRACKET LAMP ASBY MOUNTING
7342025	BRACKET OPTICAL SENSOR MOUNT
7342026	STOP MICROPLATE
7342027	COVER POWER RECEPTACLE
7342030	SPACER PCB (2 REQUIRED)
7342031	CARRIER RETAINING SPRING MICROPLATE
7342032	HINGE TOP CASE
7342033	GASKET DIODE
7342034	BRACKET FAN MOUNTING
7342036	SPACER TENSIONER
7342039	BELT TENSIONER MOLDED
7342041	BRACKET COVER SPRING

Item	Description
7342042	BRACKET LID
7342067	HINGE TRACK DR INCBR/ROBOTIC
7342069	FIBER OPTICS SPRAY 340NM UV
7342500	JIG MICROPLATE STOP ALIGN
7342504	JIG FOAM ALIGNMENT
7343000	SHIPPING CONTAINER
8050517	CABLE MOTOR ASBY
8050529	CABLE CHAS-LWR CENT BASE ASBY
9000550	CABLE INCBR FAN
9002003	SPRING RETAINING LAMP
9002004	SPACER LENS GLASS

Note: Shaded Areas indicate Commonly Used Parts

Chapter 12

Bills of Material

This section contains the Bills of Material used in building the ELx808 Automated Microplate reader and its variations. These documents are subject to change.

PART NUMBER	DESCRIPTION
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[EL808 8 Channel Reader](#), page 12-3
[EL808I 8 Channel Reader with Incubation Reduced Sftwr](#), page 12-4
[EL808IU 8 Channel Reader with Inc and Uv Reduced Sftwr](#), page 12-5
[EL808RIU 8 Channel Reader w/Robot Inc and Uv Reduced Sftwr](#), page 12-6
[EL808U 8 Channel Reader w/ Uv Reduced Sftwr](#), page 12-7

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[ELx808I 8 Channel Reader w/ Incubation](#), page 12-9
[ELx808U 8 Channel Reader w/ Uv Optics](#), page 12-10
[ELx808IU 8 Channel Reader w/ Inc and Uv Optics](#), page 12-11
[ELx808R 8 Channel Reader w/ Robot](#), page 12-12
[ELx808RI 8 Channel Reader w/ Robot and Inc](#), page 12-13
[ELx808RU 8 Channel Reader w/ Robot and Uv Optics](#), page 12-14
[ELx808RIU 8 Channel Reader w/ Robot Inc and Uv Optics](#), page 12-15
[ELx808G 8 Channel Reader Generic](#), page 12-16
[ELx808GI 8 Channel Reader Generic w/ Incubation](#), page 12-17
[ELx808GU 8 Channel Reader Generic w/ Uv Optics](#), page 12-18
[ELx808GIU 8 Channel Reader Generic w/ Inc and Uv Optics](#), page 12-19

[7340001 Shipping Accessories](#), page 12-20
[7340007 Final Assembly w/ Incubation](#), page 12-20
[7340008 Final Assembly w/ Uv Optics](#), page 12-21
[7340009 Final Assembly w/ Incubation and Uv Optics](#), page 12-21
[7340010 Final Assembly w/ Robot](#), page 12-21
[7340011 Final Assembly w/ Robot and Incubation](#), page 12-22
[7340012 Final Assembly w/ Robot and Uv Optics](#), page 12-22
[7340013 Final Assembly w/ Robot Inc and Uv Optics](#), page 12-22
[7340018 Final Assembly Generic w/ Inc and Uv Optics](#), page 12-23
[7340019 Final Assembly Generic w/ Uv Optics](#), page 12-23
[7340020 Final Assembly Generic w/ Incubation](#), page 12-23
[7340021 Final Assembly Generic 8 Channel Reader](#), page 12-24

[7340404-BOM Main PCB w/Robot Motor Drive Assembly](#), page 12-24
[7340523-BOM Mechanical Pre-Assembled Assembly](#), page 12-25
[7340537-BOM Mechanical Pre Assembled Assembly](#), page 12-26

EL808 8 Channel Reader

EL808 8 Channel Reader rev AC As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16016	LKWSHR #8 HELICAL SPR SS	A	3	
17054	WSHR FL .188IDX.438ODX.049 SS	D	3	
19053	SCR SOCK CAP 8-32X5/16 BK	A	3	
3100405	310 FILTER ASBY 405NM	A	1	INSTALLED IN POSITION 1
3100450	310 FILTER ASBY 450NM	A	1	INSTALLED IN POSITION 2
3100490	310 FILTER ASBY 490NM	A	1	INSTALLED IN POSITION 3
3100630	310 FILTER ASBY 630NM	A	1	INSTALLED IN POSITION 4
3122037	PLUG FILTER WHEEL	B	2	INSTALLED IN POSITION 5,6
44242	LABEL 110 VOLTS	B	1	
49166	FOOT RUBBER CONE BLACK	A	2	
49748	FSTNR 8-32X3/8 BLACK SLOT	A	7	
7340001	SHIPPING ACCESSORIES	F	1	
7340005	FINAL ASBY	O	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340005-DS	-FINAL ASBY DATA SHEET	P	0	DOCUMENT ONLY
7340005-TP	-FINAL ASBY TEST PROCEDURE	Q	0	DOCUMENT ONLY
7340201	FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340210	FRMWR ASSAY/CONFIG EL808 V2.00	B	0	TOOL ONLY
7340210-SP	-FRMWR ASSAY/CONFIG EL808V2.00	B	0	TOOL ONLY
7341005	DECLARATION OF CONFORMITY	D	1	
7341020	OVRLY FRONT EL808 PURPLE	B	1	
7342004	COVER BOTTOM	D	1	
7771010	LABEL ETL UL CSA 1010.1 LISTED	C	1	
7771012	TAG S/N WITH CE MARK	A	1	
8290206	SFTWR DOWNLOAD UTIL V1.42	H	0	TOOL ONLY
9001018	LABEL IN-VITRO DIAG USE	A	1	

EL808I 8 Channel Reader with Incubation Reduced Sftwr

EL808I 8 Channel Reader with Incubation Reduced Sftwr rev M As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16016	LKWSHR #8 HELICAL SPR SS	A	3	
17054	WSHR FL .188IDX.438ODX.049 SS	D	3	
19053	SCR SOCK CAP 8-32X5/16 BK	A	3	
3100405	310 FILTER ASBY 405NM	A	1	INSTALL IN POSITION 1
3100450	310 FILTER ASBY 450NM	A	1	INSTALL IN POSITION 2
3100490	310 FILTER ASBY 490NM	A	1	INSTALL IN POSITION 3
3100630	310 FILTER ASBY 630NM	A	1	INSTALL IN POSITION 4
3122037	PLUG FILTER WHEEL	B	2	INSTALL IN POSITION 5,6
44242	LABEL 110 VOLTS	B	1	
49166	FOOT RUBBER CONE BLACK	A	2	
49748	FSTNR 8-32X3/8 BLACK SLOT	A	7	
7340001	SHIPPING ACCESSORIES	F	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340005-DS	-FINAL ASBY DATA SHEET	P	0	DOCUMENT ONLY
7340005-TP	-FINAL ASBY TEST PROCEDURE	Q	0	DOCUMENT ONLY
7340007	FINAL ASBY W/INCBR	N	1	
7340201	FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340201-SP	-FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340210	FRMWR ASSAY/CONFIG EL808 V2.00	B	0	TOOL ONLY
7340210-SP	-FRMWR ASSAY/CONFIG EL808V2.00	B	0	DOCUMENT ONLY
7341005	DECLARATION OF CONFORMITY	D	1	
7341020	OVRLY FRONT EL808 PURPLE	B	1	
7342004	COVER BOTTOM	D	1	
7771010	LABEL ETL UL CSA 1010.1 LISTED	C	1	
7771012	TAG S/N WITH CE MARK	A	1	
8290206	SFTWR DOWNLOAD UTIL V1.42	H	0	TOOL ONLY
9001018	LABEL IN-VITRO DIAG USE	A	1	
99125	LABEL 1"X1/2" CONTINOUS	C	1	MARK WITH MODEL NUMBER

EL808IU 8 Channel Reader with Inc and Uv Reduced Sftwr

EL808IU 8 Channel Reader with Inc and Uv Reduced Sftwr rev N As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16016	LKWSHR #8 HELICAL SPR SS	A	3	
17054	WSHR FL .188IDX.438ODX.049 SS	D	3	
19053	SCR SOCK CAP 8-32X5/16 BK	A	3	
3100340	310 FILTER ASBY 340NM	A	1	INSTALL IN POSITION 5
3100405	310 FILTER ASBY 405NM	A	1	INSTALL IN POSITION 1
3100450	310 FILTER ASBY 450NM	A	1	INSTALL IN POSITION 2
3100490	310 FILTER ASBY 490NM	A	1	INSTALL IN POSITION 3
3100630	310 FILTER ASBY 630NM	A	1	INSTALL IN POSITION 4
3122037	PLUG FILTER WHEEL	B	1	INSTALL IN POSITION 6
44242	LABEL 110 VOLTS	B	1	
49166	FOOT RUBBER CONE BLACK	A	2	
49748	FSTNR 8-32X3/8 BLACK SLOT	A	7	
7340001	SHIPPING ACCESSORIES	F	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340005-DS	-FINAL ASBY DATA SHEET	P	0	DOCUMENT ONLY
7340005-TP	-FINAL ASBY TEST PROCEDURE	Q	0	DOCUMENT ONLY
7340009	FINAL ASBY W/INCBR UV OPTICS	N	1	
7340201	FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340201-SP	-FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340213	FRMWR ASSAY CONF EL808UV V1.00	A	0	TOOL ONLY
7340213-SP	-FRMWR ASSAY CONF EL808UVV1.00	A	0	DOCUMENT ONLY
7341005	DECLARATION OF CONFORMITY	D	1	
7341020	OVRLY FRONT EL808 PURPLE	B	1	
7342004	COVER BOTTOM	D	1	
7771010	LABEL ETL UL CSA 1010.1 LISTED	C	1	
7771012	TAG S/N WITH CE MARK	A	1	
8290206	SFTWR DOWNLOAD UTIL V1.42	H	0	TOOL ONLY
9001018	LABEL IN-VITRO DIAG USE	A	1	
99125	LABEL 1"X1/2" CONTINOUS	C	1	MARK WITH MODEL NUMBER

EL808RIU 8 Channel Reader w/Robot Inc and Uv Reduced Sftwr

EL808RIU 8 Channel Reader w/Robot Inc and Uv Reduced Sftwr rev M As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16016	LKWSHR #8 HELICAL SPR SS	A	3	
17054	WSHR FL .188IDX.438ODX.049 SS	D	3	
19053	SCR SOCK CAP 8-32X5/16 BK	A	3	
3100340	310 FILTER ASBY 340NM	A	1	INSTALL IN POSITION 5
3100405	310 FILTER ASBY 405NM	A	1	INSTALL IN POSITION 1
3100450	310 FILTER ASBY 450NM	A	1	INSTALL IN POSITION 2
3100490	310 FILTER ASBY 490NM	A	1	INSTALL IN POSITION 3
3100630	310 FILTER ASBY 630NM	A	1	INSTALL IN POSITION 4
3122037	PLUG FILTER WHEEL	B	1	INSALL IN POSITION 6
44242	LABEL 110 VOLTS	B	1	
49166	FOOT RUBBER CONE BLACK	A	2	
49748	FSTNR 8-32X3/8 BLACK SLOT	A	7	
7340001	SHIPPING ACCESSORIES	F	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340005-DS	-FINAL ASBY DATA SHEET	P	0	DOCUMENT ONLY
7340005-TP	-FINAL ASBY TEST PROCEDURE	Q	0	DOCUMENT ONLY
7340013	FINAL ASBY W/ROBOT INCBR UV	M	1	
7340201	FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340201-SP	-FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340213	FRMWR ASSAY CONF EL808UV V1.00	A	0	TOOL ONLY
7340213-SP	-FRMWR ASSAY CONF EL808UVV1.00	A	0	DOCUMENT ONLY
7341011	OVRLY 808 FRONT	B	1	
7342004	COVER BOTTOM	D	1	
7771010	LABEL ETL UL CSA 1010.1 LISTED	C	1	
7771012	TAG S/N WITH CE MARK	A	1	
8290206	SFTWR DOWNLOAD UTIL V1.42	H	0	TOOL ONLY
9001018	LABEL IN-VITRO DIAG USE	A	1	
99125	LABEL 1"X1/2" CONTINOUS	C	1	MARK WITH MODEL NUMBER

EL808U 8 Channel Reader w/ Uv Reduced Sftwr

EL808U 8 Channel Reader w/ Uv Reduced Sftwr rev N As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16016	WSHR LK SP 8 SS	A	3	
17054	WSHR FL .188IDX.438ODX.049 SS	D	3	
19053	SCR SCH 8-32X5/16 STL BLK	A	3	
3100340	310 FILTER ASBY 340NM	A	1	INSTALL IN POSITION 5
3100405	310 FILTER ASBY 405NM	A	1	INSTALL IN POSITION 1
3100450	310 FILTER ASBY 450NM	A	1	INSTALL IN POSITION 2
3100490	310 FILTER ASBY 490NM	A	1	INSTALL IN POSITION 3
3100630	310 FILTER ASBY 630NM	A	1	INSTALL IN POSITION 4
3122037	PLUG FILTER WHEEL	B	1	INSTALL IN POSITION 6
44242	LABEL 110 VOLTS	B	1	
49166	FOOT RUBBER CONE BLACK	A	2	
49748	FSTNR 8-32X3/8 BLACK SLOT	A	7	
7340001	SHIPPING ACCESSORIES	F	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340005-DS	-FINAL ASBY DATA SHEET	P	0	DOCUMENT ONLY
7340005-TP	-FINAL ASBY TEST PROCEDURE	Q	0	DOCUMENT ONLY
7340008	FINAL ASBY W/UV OPTICS	N	1	
7340201	FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340201-SP	-FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340213	FRMWR ASSAY CONF EL808UV V1.00	A	0	TOOL ONLY
7340213-SP	-FRMWR ASSAY CONF EL808UVV1.00	A	0	DOCUMENT ONLY
7341005	DECLARATION OF CONFORMITY	D	1	
7341020	OVRLY FRONT EL808 PURPLE	B	1	
7342004	COVER BOTTOM	D	1	
7771010	LABEL ETL UL CSA 1010.1 LISTED	C	1	
7771012	TAG S/N WITH CE MARK	A	1	
8290206	SFTWR DOWNLOAD UTIL V1.42	H	0	TOOL ONLY
9001018	LABEL IN-VITRO DIAG USE	A	1	
99125	LABEL 1"X1/2" CONTINOUS	C	1	MARK WITH MODEL NUMBER

ELx808 8 Channel Reader

ELx808 8 Channel Reader rev AG As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16016	LKWSHR #8 HELICAL SPR SS	A	3	
17054	WSHR FL .188IDX.438ODX.049 SS	D	3	
19053	SCR SOCK CAP 8-32X5/16 BK	A	3	
3100405	310 FILTER ASBY 405NM	A	1	INSTALLED IN POSITION 1
3100450	310 FILTER ASBY 450NM	A	1	INSTALLED IN POSITION 2
3100490	310 FILTER ASBY 490NM	A	1	INSTALLED IN POSITION 3
3100630	310 FILTER ASBY 630NM	A	1	INSTALL IN POSITION 4
3122037	PLUG FILTER WHEEL	B	2	INSTALLED IN POSITION 5,6
44242	LABEL 110 VOLTS	B	1	
49166	FOOT RUBBER CONE BLACK	A	2	
49748	FSTNR 8-32X3/8 BLACK SLOT	A	7	
7340001	SHIPPING ACCESSORIES	F	1	
7340005	FINAL ASBY	O	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340005-DS	-FINAL ASBY DATA SHEET	P	0	DOCUMENT ONLY
7340005-TP	-FINAL ASBY TEST PROCEDURE	Q	0	DOCUMENT ONLY
7340201	FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340201-SP	-FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340202	FRMWR DWNLD ASSAY/CONFIG V2.80	E	0	TOOL ONLY
7340202-SP	-FRMWR DWNLD ASSAY/CONFIGV2.80	E	0	TOOL ONLY
7341005	DECLARATION OF CONFORMITY	D	1	
7341011	OVRLY 808 FRONT	B	1	
7342004	COVER BOTTOM	D	1	
7771010	LABEL ETL UL CSA 1010.1 LISTED	C	1	
7771012	TAG S/N WITH CE MARK	A	1	
8290206	SFTWR DOWNLOAD UTIL V1.42	H	0	TOOL ONLY
9001018	LABEL IN-VITRO DIAG USE	A	1	

ELx808I 8 Channel Reader w/ Incubation

ELx808I 8 Channel Reader w/ Incubation rev AG As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16016	LKWSHR #8 HELICAL SPR SS	A	3	
17054	WSHR FL .188IDX.438ODX.049 SS	D	3	
19053	SCR SOCK CAP 8-32X5/16 BK	A	3	
3100405	310 FILTER ASBY 405NM	A	1	INSTALL IN POSITION 1
3100450	310 FILTER ASBY 450NM	A	1	INSTALL IN POSITION 2
3100490	310 FILTER ASBY 490NM	A	1	INSTALL IN POSITION 3
3100630	310 FILTER ASBY 630NM	A	1	INSTALL IN POSITION 4
3122037	PLUG FILTER WHEEL	B	2	INSTALL IN POSITION 5,6
44242	LABEL 110 VOLTS	B	1	
49166	FOOT RUBBER CONE BLACK	A	2	
49748	FSTNR 8-32X3/8 BLACK SLOT	A	7	
7340001	SHIPPING ACCESSORIES	F	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340005-DS	-FINAL ASBY DATA SHEET	P	0	DOCUMENT ONLY
7340005-TP	-FINAL ASBY TEST PROCEDURE	Q	0	DOCUMENT ONLY
7340007	FINAL ASBY W/INCBR	N	1	
7340201	FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340201-SP	-FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340202	FRMWR DWNLD ASSAY/CONFIG V2.80	E	0	TOOL ONLY
7340202-SP	-FRMWR DWNLD ASSAY/CONFIGV2.80	E	0	TOOL ONLY
7341005	DECLARATION OF CONFORMITY	D	1	
7341011	OVRLY 808 FRONT	B	1	
7342004	COVER BOTTOM	D	1	
7771010	LABEL ETL UL CSA 1010.1 LISTED	C	1	
7771012	TAG S/N WITH CE MARK	A	1	
8290206	SFTWR DOWNLOAD UTIL V1.42	H	0	TOOL ONLY
9001018	LABEL IN-VITRO DIAG USE	A	1	
99125	LABEL 1"X1/2" CONTINOUS	C	1	MARK WITH MODEL NUMBER

ELx808U 8 Channel Reader w/ Uv Optics

ELx808U 8 Channel Reader w/ Uv rev AG As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16016	LKWSHR #8 HELICAL SPR SS	A	3	
17054	WSHR FL .188IDX.438ODX.049 SS	D	3	
19053	SCR SOCK CAP 8-32X5/16 BK	A	3	
3100340	310 FILTER ASBY 340NM	A	1	INSTALL IN POSITION 5
3100405	310 FILTER ASBY 405NM	A	1	INSTALL IN POSITION 1
3100450	310 FILTER ASBY 450NM	A	1	INSTALL IN POSITION 2
3100490	310 FILTER ASBY 490NM	A	1	INSTALL IN POSITION 3
3100630	310 FILTER ASBY 630NM	A	1	INSTALL IN POSITION 4
3122037	PLUG FILTER WHEEL	B	1	INSTALL IN POSITION 6
44242	LABEL 110 VOLTS	B	1	
49166	FOOT RUBBER CONE BLACK	A	2	
49748	FSTNR 8-32X3/8 BLACK SLOT	A	7	
7340001	SHIPPING ACCESSORIES	F	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340005-DS	-FINAL ASBY DATA SHEET	P	0	DOCUMENT ONLY
7340005-TP	-FINAL ASBY TEST PROCEDURE	Q	0	DOCUMENT ONLY
7340008	FINAL ASBY W/UV OPTICS	N	1	
7340201	FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340201-SP	-FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340203	FRMWR ASSAY/CONFIG 808UV V2.80	E	0	TOOL ONLY
7340203-SP	-FRMWR ASSAY/CONFIG 808UVV2.80	E	0	TOOL ONLY
7341005	DECLARATION OF CONFORMITY	D	1	
7341011	OVRLY 808 FRONT	B	1	
7342004	COVER BOTTOM	D	1	
7771010	LABEL ETL UL CSA 1010.1 LISTED	C	1	
7771012	TAG S/N WITH CE MARK	A	1	
8290206	SFTWR DOWNLOAD UTIL V1.42	H	0	TOOL ONLY
9001018	LABEL IN-VITRO DIAG USE	A	1	
99125	LABEL 1"X1/2" CONTINOUS	C	1	MARK WITH MODEL NUMBER

ELx808IU 8 Channel Reader w/ Inc and Uv Optics

ELx808IU 8 Channel Reader w/ Inc and Uv Optics rev AG As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16016	LKWSHR #8 HELICAL SPR SS	A	3	
17054	WSHR FL .188IDX.438ODX.049 SS	D	3	
19053	SCR SOCK CAP 8-32X5/16 BK	A	3	
3100340	310 FILTER ASBY 340NM	A	1	INSTALL IN POSITION 5
3100405	310 FILTER ASBY 405NM	A	1	INSTALL IN POSITION 1
3100450	310 FILTER ASBY 450NM	A	1	INSTALL IN POSITION 2
3100490	310 FILTER ASBY 490NM	A	1	INSTALL IN POSITION 3
3100630	310 FILTER ASBY 630NM	A	1	INSTALL IN POSITION 4
3122037	PLUG FILTER WHEEL	B	1	INSTALL IN POSITION 6
44242	LABEL 110 VOLTS	B	1	
49166	FOOT RUBBER CONE BLACK	A	2	
49748	FSTNR 8-32X3/8 BLACK SLOT	A	7	
7340001	SHIPPING ACCESSORIES	F	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340005-DS	-FINAL ASBY DATA SHEET	P	0	DOCUMENT ONLY
7340005-TP	-FINAL ASBY TEST PROCEDURE	Q	0	DOCUMENT ONLY
7340009	FINAL ASBY W/INCBR UV OPTICS	N	1	
7340201	FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340201-SP	-FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340203	FRMWR ASSAY/CONFIG 808UV V2.80	E	0	TOOL ONLY
7340203-SP	-FRMWR ASSAY/CONFIG 808UVV2.80	E	0	TOOL ONLY
7341005	DECLARATION OF CONFORMITY	D	1	
7341013	OVRLY FRONT 808IU	B	1	
7342004	COVER BOTTOM	D	1	
7771010	LABEL ETL UL CSA 1010.1 LISTED	C	1	
7771012	TAG S/N WITH CE MARK	A	1	
8290206	SFTWR DOWNLOAD UTIL V1.42	H	0	TOOL ONLY
9001018	LABEL IN-VITRO DIAG USE	A	1	

ELx808R 8 Channel Reader w/ Robot

ELx808R 8 Channel Reader w/ Robot rev AG As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16016	LKWSHR #8 HELICAL SPR SS	A	3	
17054	WSHR FL .188IDX.438ODX.049 SS	D	3	
19053	SCR SOCK CAP 8-32X5/16 BK	A	3	
3100405	310 FILTER ASBY 405NM	A	1	INSTALL IN POSITION 1
3100450	310 FILTER ASBY 450NM	A	1	INSTALL IN POSITION 2
3100490	310 FILTER ASBY 490NM	A	1	INSTALL IN POSITION 3
3100630	310 FILTER ASBY 630NM	A	1	INSTALL IN POSITION 4
3122037	PLUG FILTER WHEEL	B	2	INSTALL IN POSITION 5,6
44242	LABEL 110 VOLTS	B	1	
49166	FOOT RUBBER CONE BLACK	A	2	
49748	FSTNR 8-32X3/8 BLACK SLOT	A	7	
7340001	SHIPPING ACCESSORIES	F	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340005-DS	-FINAL ASBY DATA SHEET	P	0	DOCUMENT ONLY
7340005-TP	-FINAL ASBY TEST PROCEDURE	Q	0	DOCUMENT ONLY
7340010	FINAL ASBY W/ROBOT INTERFACE	M	1	
7340201	FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340201-SP	-FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340202	FRMWR DWNLD ASSAY/CONFIG V2.80	E	0	TOOL ONLY
7340202-SP	-FRMWR DWNLD ASSAY/CONFIGV2.80	E	0	TOOL ONLY
7341005	DECLARATION OF CONFORMITY	D	1	
7341011	OVRLY 808 FRONT	B	1	
7342004	COVER BOTTOM	D	1	
7771010	LABEL ETL UL CSA 1010.1 LISTED	C	1	
7771012	TAG S/N WITH CE MARK	A	1	
8290206	SFTWR DOWNLOAD UTIL V1.42	H	0	TOOL ONLY
9001018	LABEL IN-VITRO DIAG USE	A	1	
99125	LABEL 1"X1/2" CONTINOUS	C	1	MARK WITH MODEL NUMBER

ELx808RI 8 Channel Reader w/ Robot and Inc

ELx808RI 8 Channel Reader w/Robot and Inc rev AG As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16016	LKWSHR #8 HELICAL SPR SS	A	3	
17054	WSHR FL .188IDX.438ODX.049 SS	D	3	
19053	SCR SOCK CAP 8-32X5/16 BK	A	3	
3100405	310 FILTER ASBY 405NM	A	1	INSTALL IN POSITION 1
3100450	310 FILTER ASBY 450NM	A	1	INSTALL IN POSITION 2
3100490	310 FILTER ASBY 490NM	A	1	INSTALL IN POSITION 3
3100630	310 FILTER ASBY 630NM	A	1	INSTALL IN POSITION 4
3122037	PLUG FILTER WHEEL	B	2	INSTALL IN POSITION 5,6
44242	LABEL 110 VOLTS	B	1	
49166	FOOT RUBBER CONE BLACK	A	2	
49748	FSTNR 8-32X3/8 BLACK SLOT	A	7	
7340001	SHIPPING ACCESSORIES	F	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340005-DS	-FINAL ASBY DATA SHEET	P	0	DOCUMENT ONLY
7340005-TP	-FINAL ASBY TEST PROCEDURE	Q	0	DOCUMENT ONLY
7340011	FINAL ASBY W/ROBOT INCBR	M	1	
7340201	FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340201-SP	-FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340202	FRMWR DWNLD ASSAY/CONFIG V2.80	E	0	TOOL ONLY
7340202-SP	-FRMWR DWNLD ASSAY/CONFIGV2.80	E	0	TOOL ONLY
7341005	DECLARATION OF CONFORMITY	D	1	
7341011	OVRLY 808 FRONT	B	1	
7342004	COVER BOTTOM	D	1	
7771010	LABEL ETL UL CSA 1010.1 LISTED	C	1	
7771012	TAG S/N WITH CE MARK	A	1	
8290206	SFTWR DOWNLOAD UTIL V1.42	H	0	TOOL ONLY
9001018	LABEL IN-VITRO DIAG USE	A	1	
99125	LABEL 1"X1/2" CONTINOUS	C	1	MARK WITH MODEL NUMBER

ELx808RU 8 Channel Reader w/ Robot and Uv Optics

ELx808RU 8 Channel Reader w/Robot and Uv Optics rev AG As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16016	LKWSHR #8 HELICAL SPR SS	A	3	
17054	WSHR FL .188IDX.438ODX.049 SS	D	3	
19053	SCR SOCK CAP 8-32X5/16 BK	A	3	
3100340	310 FILTER ASBY 340NM	A	1	INSTALL IN POSITION 5
3100405	310 FILTER ASBY 405NM	A	1	INSTALL IN POSITION 1
3100450	310 FILTER ASBY 450NM	A	1	INSTALL IN POSITION 2
3100490	310 FILTER ASBY 490NM	A	1	INSTALL IN POSITION 3
3100630	310 FILTER ASBY 630NM	A	1	INSTALL IN POSITION 4
3122037	PLUG FILTER WHEEL	B	1	INSTALL IN POSITION 6
44242	LABEL 110 VOLTS	B	1	
49166	FOOT RUBBER CONE BLACK	A	2	
49748	FSTNR 8-32X3/8 BLACK SLOT	A	7	
7340001	SHIPPING ACCESSORIES	F	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340005-DS	-FINAL ASBY DATA SHEET	P	0	DOCUMENT ONLY
7340005-TP	-FINAL ASBY TEST PROCEDURE	Q	0	DOCUMENT ONLY
7340012	FINAL ASBY W/ROBOT UV OPTICS	M	1	
7340201	FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340201-SP	-FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340203	FRMWR ASSAY/CONFIG 808UV V2.80	E	0	TOOL ONLY
7340203-SP	-FRMWR ASSAY/CONFIG 808UVV2.80	E	0	TOOL ONLY
7341005	DECLARATION OF CONFORMITY	D	1	
7341011	OVRLY 808 FRONT	B	1	
7342004	COVER BOTTOM	D	1	
7771010	LABEL ETL UL CSA 1010.1 LISTED	C	1	
7771012	TAG S/N WITH CE MARK	A	1	
8290206	SFTWR DOWNLOAD UTIL V1.42	H	0	TOOL ONLY
9001018	LABEL IN-VITRO DIAG USE	A	1	
99125	LABEL 1"X1/2" CONTINUOUS	C	1	MARK WITH MODEL NUMBER

ELx808RIU 8 Channel Reader w/ Robot Inc and Uv Optics

ELx808RIU 8 Channel Reader w/Robot Inc and Uv Optics rev AH As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16016	LKWSHR #8 HELICAL SPR SS	A	3	
17054	WSHR FL .188IDX.438ODX.049 SS	D	3	
19053	SCR SOCK CAP 8-32X5/16 BK	A	3	
3100340	310 FILTER ASBY 340NM	A	1	INSTALL IN POSITION 5
3100405	310 FILTER ASBY 405NM	A	1	INSTALL IN POSITION 1
3100450	310 FILTER ASBY 450NM	A	1	INSTALL IN POSITION 2
3100490	310 FILTER ASBY 490NM	A	1	INSTALL IN POSITION 3
3100630	310 FILTER ASBY 630NM	A	1	INSTALL IN POSITION 4
3122037	PLUG FILTER WHEEL	B	1	INSTALL IN POSITION 6
44242	LABEL 110 VOLTS	B	1	
49166	FOOT RUBBER CONE BLACK	A	2	
49748	FSTNR 8-32X3/8 BLACK SLOT	A	7	
7340001	SHIPPING ACCESSORIES	F	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340005-DS	-FINAL ASBY DATA SHEET	P	0	DOCUMENT ONLY
7340005-TP	-FINAL ASBY TEST PROCEDURE	Q	0	DOCUMENT ONLY
7340013	FINAL ASBY W/ROBOT INCBR UV	M	1	
7340201	FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340201-SP	-FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340203	FRMWR ASSAY/CONFIG 808UV V2.80	E	0	TOOL ONLY
7340203-SP	-FRMWR ASSAY/CONFIG 808UVV2.80	E	0	TOOL ONLY
7341005	DECLARATION OF CONFORMITY	D	1	
7341013	OVRLY FRONT 808IU	B	1	
7342004	COVER BOTTOM	D	1	
7771010	LABEL ETL UL CSA 1010.1 LISTED	C	1	
7771012	TAG S/N WITH CE MARK	A	1	
8290206	SFTWR DOWNLOAD UTIL V1.42	H	0	TOOL ONLY
9001018	LABEL IN-VITRO DIAG USE	A	1	
99125	LABEL 1"X1/2" CONTINOUS	C	1	MARK WITH MODEL NUMBER

ELx808G 8 Channel Reader Generic

ELx808G 8 Channel Reader Generic rev AE As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16016	LKWSHR #8 HELICAL SPR SS	A	3	
17054	WSHR FL .188IDX.438ODX.049 SS	D	3	
19053	SCR SOCK CAP 8-32X5/16 BK	A	3	
3100405	310 FILTER ASBY 405NM	A	1	INSTALL IN POSITION 1
3100450	310 FILTER ASBY 450NM	A	1	INSTALL IN POSITION 2
3100490	310 FILTER ASBY 490NM	A	1	INSTALL IN POSITION 3
3100630	310 FILTER ASBY 630NM	A	1	INSTALL IN POSITION 4
3122037	PLUG FILTER WHEEL	B	2	INSTALL IN POSITIONS 5,6
44242	LABEL 110 VOLTS	B	1	
49166	FOOT RUBBER CONE BLACK	A	2	
49748	FSTNR 8-32X3/8 BLACK SLOT	A	7	
7340001	SHIPPING ACCESSORIES	F	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340005-DS	-FINAL ASBY DATA SHEET	P	0	DOCUMENT ONLY
7340005-TP	-FINAL ASBY TEST PROCEDURE	Q	0	DOCUMENT ONLY
7340021	FINAL ASBY GENERIC 8-CH RDR	I	1	
7340201	FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340201-SP	-FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340208	FRMWR DWNLD AS/CONF 808G V2.00	D	0	TOOL ONLY
7340208-SP	-FRMWR DWNLD AS/CONF 808GV2.00	D	0	TOOL ONLY
7341005	DECLARATION OF CONFORMITY	D	1	
7342004	COVER BOTTOM	D	1	
7771010	LABEL ETL UL CSA 1010.1 LISTED	C	1	
7771012	TAG S/N WITH CE MARK	A	1	
8290206	SFTWR DOWNLOAD UTIL V1.42	H	0	TOOL ONLY
9001018	LABEL IN-VITRO DIAG USE	A	1	
99125	LABEL 1"X1/2" CONTINOUS	C	1	MARK WITH MODEL NUMBER

ELx808GI 8 Channel Reader Generic w/ Incubation

ELx808GI 8 Channel Reader Generic w/ Incubation rev AE As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16016	LKWSHR #8 HELICAL SPR SS	A	3	
17054	WSHR FL .188IDX.438ODX.049 SS	D	3	
19053	SCR SOCK CAP 8-32X5/16 BK	A	3	
3100405	310 FILTER ASBY 405NM	A	1	INSTALLED IN POSITION 1
3100450	310 FILTER ASBY 450NM	A	1	INSTALLED IN POSITION 2
3100490	310 FILTER ASBY 490NM	A	1	INSTALLED IN POSITION 3
3100630	310 FILTER ASBY 630NM	A	1	INSTALL IN POSITION 4
3122037	PLUG FILTER WHEEL	B	2	INSTALL IN POSITIONS 5,6
44242	LABEL 110 VOLTS	B	1	
49166	FOOT RUBBER CONE BLACK	A	2	
49748	FSTNR 8-32X3/8 BLACK SLOT	A	7	
7340001	SHIPPING ACCESSORIES	F	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340005-DS	-FINAL ASBY DATA SHEET	P	0	DOCUMENT ONLY
7340005-TP	-FINAL ASBY TEST PROCEDURE	Q	0	DOCUMENT ONLY
7340020	FINAL ASBY W/INCBR GENERIC	I	1	
7340201	FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340201-SP	-FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340208	FRMWR DWNLD AS/CONF 808G V2.00	D	0	TOOL ONLY
7340208-SP	-FRMWR DWNLD AS/CONF 808GV2.00	D	0	TOOL ONLY
7341005	DECLARATION OF CONFORMITY	D	1	
7342004	COVER BOTTOM	D	1	
7771010	LABEL ETL UL CSA 1010.1 LISTED	C	1	
7771012	TAG S/N WITH CE MARK	A	1	
8290206	SFTWR DOWNLOAD UTIL V1.42	H	0	TOOL ONLY
9001018	LABEL IN-VITRO DIAG USE	A	1	
99125	LABEL 1"X1/2" CONTINOUS	C	1	MARK WITH MODEL NUMBER

ELx808GU 8 Channel Reader Generic w/ Uv Optics

ELx808GU 8 Channel Reader Generic w/ Uv Optics rev AE As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16016	LKWSHR #8 HELICAL SPR SS	A	3	
17054	WSHR FL .188IDX.438ODX.049 SS	D	3	
19053	SCR SOCK CAP 8-32X5/16 BK	A	3	
3100340	310 FILTER ASBY 340NM	A	1	INSTALLED IN POSITION 5
3100405	310 FILTER ASBY 405NM	A	1	INSTALL IN POSITION 1
3100450	310 FILTER ASBY 450NM	A	1	INSTALL IN POSITION 2
3100490	310 FILTER ASBY 490NM	A	1	INSTALL IN POSTION 3
3100630	310 FILTER ASBY 630NM	A	1	INSTALL IN POSITION 4
3122037	PLUG FILTER WHEEL	B	1	INSTALL IN POSITION 6
44242	LABEL 110 VOLTS	B	1	
49166	FOOT RUBBER CONE BLACK	A	2	
49748	FSTNR 8-32X3/8 BLACK SLOT	A	7	
7340001	SHIPPING ACCESSORIES	F	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340005-DS	-FINAL ASBY DATA SHEET	P	0	DOCUMENT ONLY
7340005-TP	-FINAL ASBY TEST PROCEDURE	Q	0	DOCUMENT ONLY
7340019	FINAL ASBY W/UV OPTICS GENERIC	I	1	
7340201	FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340201-SP	-FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340207	FRMWR DWNLD AS/CON 808GUVV2.00	D	0	TOOL ONLY
7340207-SP	-FRMWR DWNLD AS/CON808GUVV2.00	D	0	TOOL ONLY
7341005	DECLARATION OF CONFORMITY	D	1	
7342004	COVER BOTTOM	D	1	
7771010	LABEL ETL UL CSA 1010.1 LISTED	C	1	
7771012	TAG S/N WITH CE MARK	A	1	
8290206	SFTWR DOWNLOAD UTIL V1.42	H	0	TOOL ONLY
9001018	LABEL IN-VITRO DIAG USE	A	1	
99125	LABEL 1"X1/2" CONTINOUS	C	1	MARK WITH MODEL NUMBER

ELx808GIU 8 Channel Reader Generic w/ Inc and Uv Optics

ELx808GIU 8 Channel Reader Generic w/ Inc and Uv Optics rev AE As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16016	WSHR LK SP 8 SS	A	3	
17054	WSHR FL .188IDX.438ODX.049 SS	D	3	
19053	SCR SCH 8-32X5/16 STL BLK	A	3	
3100340	310 FILTER ASBY 340NM	A	1	INSTALL IN POSITION 5
3100405	310 FILTER ASBY 405NM	A	1	INSTALL IN POSITION 1
3100450	310 FILTER ASBY 450NM	A	1	INSTALL IN POSITION 2
3100490	310 FILTER ASBY 490NM	A	1	INSTALL IN POSITION 3
3100630	310 FILTER ASBY 630NM	A	1	INSTALL IN POSITION 4
3122037	PLUG FILTER WHEEL	B	1	INSTALL IN POSITION 6
44242	LABEL 110 VOLTS	B	1	
49166	FOOT RUBBER CONE BLACK	A	2	
49748	FSTNR 8-32X3/8 BLACK SLOT	A	7	
7340001	SHIPPING ACCESSORIES	F	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340005-DS	-FINAL ASBY DATA SHEET	P	0	DOCUMENT ONLY
7340005-TP	-FINAL ASBY TEST PROCEDURE	Q	0	DOCUMENT ONLY
7340018	FINAL ASBY W/INCBR UV GENERIC	I	1	
7340201	FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340201-SP	-FRMWR DOWNLOAD BASECODE V3.13	P	0	TOOL ONLY
7340207	FRMWR DWNLD AS/CON 808GUVV2.00	D	0	TOOL ONLY
7340207-SP	-FRMWR DWNLD AS/CON808GUVV2.00	D	0	TOOL ONLY
7341005	DECLARATION OF CONFORMITY	D	1	
7342004	COVER BOTTOM	D	1	
7771010	LABEL ETL UL CSA 1010.1 LISTED	C	1	
7771012	TAG S/N WITH CE MARK	A	1	
8290206	SFTWR DOWNLOAD UTIL V1.42	H	0	TOOL ONLY
9001018	LABEL IN-VITRO DIAG USE	A	1	
99125	LABEL 1"X1/2" CONTINUOUS	C	1	MARK WITH MODEL NUMBER

7340001 Shipping Accessories

7340001 Shipping Accessories rev F As of 10-12-01				
Item	Description	Rev	Qty	Remarks
71072	CABLE,FOR PRINTER, IBMPC 6FT	A	1	IN BOX WITH UNIT
7341000	MANUAL ELX808 OPERATORS	H	1	IN BOX WITH UNIT
7341022	INSTRUCTIONS CUSTOMER PACKING	A	1	IN BOX WITH UNIT
7342066	DUST COVER	A	1	IN BOX WITH UNIT
7343000	SHIPPING CONTAINER ASBY	E	1	
75053	CABLE SERIAL DB9F TO DB25F	G	1	
91011	BAG JIFFY #2 8.5X12	A	0	BAG 1 FOR FILTER WHEEL
91016	TAPE REINF GUMMED 3" BRN	A	0	
94075	SHIPPING DOCUMENT KIT	G	1	INSERTED BY SHIPPING
98083	BAG,9X12 PLASTIC 2MIL	A	0	BAG 2 FOR FILTER WHEEL
98085	BAG POLY 26X32 2 MIL	A	0	BAG 3 FOR UNIT

7340005 Final Assembly 8 Channel Reader

7340005 Final Assembly 8 Channel Reader rev O As of 10-12-01				
Item	Description	Rev	Qty	Remarks
7331023	OVRLY KEYBOARD READER	B	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340006	GENERIC SUB FINAL ASBY	H	1	
7340513	TRACK ASBY	J	1	
7340533-AS	-TOP CASE ASBY	F	0	DOCUMENT ONLY
7340537	MECH PRE ASSEMBLED ASBY	E	1	
7342000	CASE TOP	I	1	
7342001	LID TOP CASE	H	1	
7342002	FIBER OPTICS SPRAY 380NM	F	1	
7770102	LABEL "FCC COMPLIANCE"	A	1	

7340007 Final Assembly w/ Incubation

7340007 Final Assembly w/ Incubation rev N As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16050	WSHR,FL,.174 X .43 X .062NEOP	A	4	
19186	SEMS 6-32X1/4 ST PHIL ITOOTH	A	4	
7331023	OVRLY KEYBOARD READER	B	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340006	GENERIC SUB FINAL ASBY	H	1	
7340403	INCBR PCB ASBY	F	1	
7340509	CABLE INCUBATOR INT ASBY	B	1	CABLE E
7340514	TRACK W/INCUBATION ASBY	K	1	
7340533-AS	-TOP CASE ASBY	F	0	DOCUMENT ONLY
7340537	MECH PRE ASSEMBLED ASBY	E	1	
7342000	CASE TOP	I	1	
7342001	LID TOP CASE	H	1	
7342002	FIBER OPTICS SPRAY 380NM	F	1	
7770102	LABEL "FCC COMPLIANCE"	A	1	

7340008 Final Assembly w/ Uv Optics

7340008 Final Assembly w/ Uv Optics rev N As of 10-12-01				
Item	Description	Rev	Qty	Remarks
7331023	OVRLY KEYBOARD READER	B	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340006	GENERIC SUB FINAL ASBY	H	1	
7340513	TRACK ASBY	J	1	
7340533-AS	-TOP CASE ASBY	F	0	DOCUMENT ONLY
7340537	MECH PRE ASSEMBLED ASBY	E	1	
7342000	CASE TOP	I	1	
7342001	LID TOP CASE	H	1	
7342069	FIBER OPTICS SPRAY 340NM UV	B	1	
7770102	LABEL "FCC COMPLIANCE"	A	1	

7340009 Final Assembly w/ Incubation and Uv Optics

7340009 Final Assembly w/ Incubation and Uv Optics rev N As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16050	WSHR,FL,.174 X .43 X .062NEOP	A	4	
19186	SEMS 6-32X1/4 ST PHIL ITOOTH	A	4	
7331023	OVRLY KEYBOARD READER	B	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340006	GENERIC SUB FINAL ASBY	H	1	
7340403	INCBR PCB ASBY	F	1	
7340509	CABLE INCUBATOR INT ASBY	B	1	CABLE E
7340514	TRACK W/INCUBATION ASBY	K	1	
7340533-AS	-TOP CASE ASBY	F	0	DOCUMENT ONLY
7340537	MECH PRE ASSEMBLED ASBY	E	1	
7342000	CASE TOP	I	1	
7342001	LID TOP CASE	H	1	
7342069	FIBER OPTICS SPRAY 340NM UV	B	1	
7770102	LABEL "FCC COMPLIANCE"	A	1	

7340010 Final Assembly w/ Robot

7340010 Final Assembly w/ Robot rev M As of 10-12-01				
Item	Description	Rev	Qty	Remarks
7331023	OVRLY KEYBOARD READER	B	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340006	GENERIC SUB FINAL ASBY	H	1	
7340015	SUB FINAL ASBY ROBOT	F	1	
7340515	TRACK ROBOT ASBY	H	1	
7340529	MECH PRE ASSEMBLED ASBY ROBOT	G	1	
7340533-AS	-TOP CASE ASBY	F	0	DOCUMENT ONLY
7342000	CASE TOP	I	1	
7342002	FIBER OPTICS SPRAY 380NM	F	1	
7342059	LID TOP COVER ROBOTIC	C	1	
7770102	LABEL "FCC COMPLIANCE"	A	1	

7340011 Final Assembly w/ Robot and Incubation

7340011 Final Assembly w/ Robot and Inc rev M As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16050	WSHR,FL,.174 X .43 X .062NEOP	A	4	
19186	SEMS 6-32X1/4 ST PHIL ITOOTH	A	4	
7331023	OVRLY KEYBOARD READER	B	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340006	GENERIC SUB FINAL ASBY	H	1	
7340015	SUB FINAL ASBY ROBOT	F	1	
7340403	INCBR PCB ASBY	F	1	
7340509	CABLE INCUBATOR INT ASBY	B	1	CABLE E
7340511	TRACK ROBOT W/INCBR ASBY	J	1	
7340529	MECH PRE ASSEMBLED ASBY ROBOT	G	1	
7340533-AS	-TOP CASE ASBY	F	0	DOCUMENT ONLY
7342000	CASE TOP	I	1	
7342002	FIBER OPTICS SPRAY 380NM	F	1	
7342059	LID TOP COVER ROBOTIC	C	1	
7770102	LABEL "FCC COMPLIANCE"	A	1	

7340012 Final Assembly w/ Robot and Uv Optics

7340012 Final Assembly w Robot and Uv Optics rev M As of 10-12-01				
Item	Description	Rev	Qty	Remarks
7331023	OVRLY KEYBOARD READER	B	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340006	GENERIC SUB FINAL ASBY	H	1	
7340015	SUB FINAL ASBY ROBOT	F	1	
7340515	TRACK ROBOT ASBY	H	1	
7340529	MECH PRE ASSEMBLED ASBY ROBOT	G	1	
7340533-AS	-TOP CASE ASBY	F	0	DOCUMENT ONLY
7342000	CASE TOP	I	1	
7342059	LID TOP COVER ROBOTIC	C	1	
7342069	FIBER OPTICS SPRAY 340NM UV	B	1	
7770102	LABEL "FCC COMPLIANCE"	A	1	

7340013 Final Assembly w/ Robot Inc and Uv Optics

7340013 Final Assembly w/ Robot Inc and Uv Optics rev M As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16050	WSHR,FL,.174 X .43 X .062NEOP	A	4	
19186	SEMS 6-32X1/4 ST PHIL ITOOTH	A	4	
7331023	OVRLY KEYBOARD READER	B	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340006	GENERIC SUB FINAL ASBY	H	1	
7340015	SUB FINAL ASBY ROBOT	F	1	
7340403	INCBR PCB ASBY	F	1	
7340509	CABLE INCUBATOR INT ASBY	B	1	CABLE E
7340511	TRACK ROBOT W/INCBR ASBY	J	1	
7340529	MECH PRE ASSEMBLED ASBY ROBOT	G	1	
7340533-AS	-TOP CASE ASBY	F	0	DOCUMENT ONLY
7342000	CASE TOP	I	1	
7342059	LID TOP COVER ROBOTIC	C	1	
7342069	FIBER OPTICS SPRAY 340NM UV	B	1	
7770102	LABEL "FCC COMPLIANCE"	A	1	

7340018 Final Assembly Generic w/ Inc and Uv Optics

7340018 Final Assembly Generic w/ Inc and Uv Optics rev I As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16050	WSHR,FL,.174 X .43 X .062NEOP	A	4	
19186	SEMS 6-32X1/4 ST PHIL ITOOTH	A	4	
7331010	OVRLY KEYBOARD GENERIC	E	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340006	GENERIC SUB FINAL ASBY	H	1	
7340403	INCBR PCB ASBY	F	1	
7340509	CABLE INCUBATOR INT ASBY	B	1	CABLE E
7340514	TRACK W/INCUBATION ASBY	K	1	
7340533-AS	-TOP CASE ASBY	F	0	DOCUMENT ONLY
7340537	MECH PRE ASSEMBLED ASBY	E	1	
7342001	LID TOP CASE	H	1	
7342069	FIBER OPTICS SPRAY 340NM UV	B	1	
7342071	CASE TOP GENERIC	E	1	
7770102	LABEL "FCC COMPLIANCE"	A	1	

7340019 Final Assembly Generic w/ Uv Optics

7340019 Final Assembly Generic w/ Uv Optics rev I As of 10-12-01				
Item	Description	Rev	Qty	Remarks
7331010	OVRLY KEYBOARD GENERIC	E	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340006	GENERIC SUB FINAL ASBY	H	1	
7340513	TRACK ASBY	J	1	
7340533-AS	-TOP CASE ASBY	F	0	DOCUMENT ONLY
7340537	MECH PRE ASSEMBLED ASBY	E	1	
7342001	LID TOP CASE	H	1	
7342069	FIBER OPTICS SPRAY 340NM UV	B	1	
7342071	CASE TOP GENERIC	E	1	
7770102	LABEL "FCC COMPLIANCE"	A	1	

7340020 Final Assembly Generic w/ Incubation

7340020 Final Assembly Generic w/ Incubation rev I As of 10-12-01				
Item	Description	Rev	Qty	Remarks
16050	WSHR,FL,.174 X .43 X .062NEOP	A	4	
19186	SEMS 6-32X1/4 ST PHIL ITOOTH	A	4	
7331010	OVRLY KEYBOARD GENERIC	E	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340006	GENERIC SUB FINAL ASBY	H	1	
7340403	INCBR PCB ASBY	F	1	
7340509	CABLE INCUBATOR INT ASBY	B	1	CABLE E
7340514	TRACK W/INCUBATION ASBY	K	1	
7340533-AS	-TOP CASE ASBY	F	0	DOCUMENT ONLY
7340537	MECH PRE ASSEMBLED ASBY	E	1	
7342001	LID TOP CASE	H	1	
7342002	FIBER OPTICS SPRAY 380NM	F	1	
7342071	CASE TOP GENERIC	E	1	
7770102	LABEL "FCC COMPLIANCE"	A	1	

7340021 Final Assembly Generic 8 Channel Reader

7340021 Final Assembly Generic 8 Channel reader rev I As of 10-12-01				
Item	Description	Rev	Qty	Remarks
7331010	OVRLY KEYBOARD GENERIC	E	1	
7340005-AS	-FINAL ASBY	S	0	DOCUMENT ONLY
7340006	GENERIC SUB FINAL ASBY	H	1	
7340513	TRACK ASBY	J	1	
7340533-AS	-TOP CASE ASBY	F	0	DOCUMENT ONLY
7340537	MECH PRE ASSEMBLED ASBY	E	1	
7342001	LID TOP CASE	H	1	
7342002	FIBER OPTICS SPRAY 380NM	F	1	
7342071	CASE TOP GENERIC	E	1	
7770102	LABEL "FCC COMPLIANCE"	A	1	

7340404-BOM Main PCB w/Robot Motor Drive Assembly

7340404 Main PCB with Robot Motor Drive Assembly rev H As of 10-12-01				
Item	Description	Rev	Qty	Remarks
28064	IC STEPPER MOTOR DRIVER	C	1	U15
29084	IC D/A DUAL 7 BIT	E	1	U24
32047	RES 1.000K OHM 1% 1/4W	B	2	R21,22
32085	RES 15.00K OHM 1% 1/4W	B	1	R31
32232	RES 200.00OHM 1% 1/4W	B	2	R5,6
38067	RES .65 OHM 1W 1%	B	4	R19,20,27,28
42319	HEDR 4-P .100 PCB MOUNT GOLD	A	1	J11
48225	LABEL WHITE .80 X .25	C	1	MARK WITH PCB PART NUMBER
7340400-SC	-MAIN PCB ASBY SCHEMATIC	E	0	DOCUMENT ONLY
7340406	DIGITAL PCB ASBY	E	1	
7340406-AS	-DIGITAL PCB ASBY	C	0	DOCUMENT ONLY
81004	CAP 100 UF 63V ELEC	B	1	C30
84039	CAP 820 PF 200V 10% X7R	A	3	C15,41,43
84054	CAP .0033UF FILM	A	1	C42

7340523-BOM Mechanical Pre-Assembled Assembly

7340523 Mechanical Pre-Assembled Assembly rev G As of 10-12-01				
Item	Description	Rev	Qty	Remarks
12066	SCR PAN 4-40X3/8 PHILL SS	A	2	
12077	SCR SOCK CAP 6-32X1/2 SST	A	4	
12107	SCR PAN 6-32X1/2 PHILLIPS SS	A	6	
15003	LOCKNUT 6-32 SS	A	4	
15004	LOCKNUT 8-32 SS	A	2	
15005	NUT KEPS 4-40	A	5	
15007	LOCKNUT 4-40 SS	A	2	
15010	NUT KEPS 6-32	A	2	
15011	NUT KEPS 8-32	B	5	
17001	WSHR FLAT #8 SS	A	4	
17020	WSHR FLAT #6 SS .146ID	B	7	
17047	WSHR FL #12 .04" TK	A	2	
18008	WSHR FLANGED #4 NYLON	B	1	
19054	SCR SET 6-32X3/16 CUPPT BK	A	2	
19112	SCR SOCK CAP 4-40X3/8 SS	B	1	
19186	SEMS 6-32X1/4 ST PHIL ITOOTH	A	10	
19187	SEMS 4-40X1/4 ST PHIL ITOOTH	A	10	
23021	VOLT REG +ADJ 1.5A 317	C	1	
3110508	MOLDED FILTER WHEEL W/ MAGNET	A	1	
3111023	LABEL,GROUNDING SYMBOL	A	1	
3112002	RETAINER COUPLER	F	1	
3400508	49388 LAMP W/OUT LENS	B	1	
3402001	LENS CONDENSER BK7	C	1	
3402002	IR REFLECTING GLASS	D	1	
3402004	LENS, PLASTIC, UV	B	8	
42058	TIE WRAP 3"	A	2	
47010	INSUL NEOPRENE .75X3.25X1/16	A	2	
49166	FOOT RUBBER CONE BLACK	A	2	
49187	FSTNR,BLACK,6-32X1/2	B	2	
49489	CARD EDGE GUIDE	A	2	
49493	SPRING COIL	A	5	
49552	PAD THERMAL TO-218	A	1	
49588	FLAT CABLE MNT W/OCLAMP 1 1/4"	A	2	
49764	SCREW JACK 4-40X.625L THREADED	A	4	
66006	LOCTITE 242 BLUE	A	0	A/R
66022	LOCTITE 271 RED SEALANT (10CC)	B	0	A/R
7120576	OPTO SHORT LEAD ASBY	E	1	712 CABLE BC
7340501	CABLE ANALOG INT ASBY	C	1	CABLE C
7340503	CABLE POWER INPUT ASBY	D	1	CABLE H
7340504	CABLE FILTER WHEEL MOTOR ASBY	B	1	CABLE K
7340505	CABLE OPTO EXTENSION ASBY	B	1	CABLE B
7340506	CABLE LAMP ASBY	E	1	CABLE J
7340510	CABLE MOTOR EXTENSION ASBY	B	1	CABLE G
7342003	PAN BASE	H	1	
7342006	BLOCK OPTIC SPACER	C	1	
7342024	BRACKET LAMP ASBY MOUNTING	A	1	
7342025	BRACKET OPTICAL SENSOR MOUNT	A	1	
7342034	BRACKET FAN MOUNTING	A	2	
7342035	STANDOFF NVT OPTICAL BLOCK	B	2	
7342040	POST OPTIC BLOCK THREADED	C	3	
9000550	CABLE INCBR FAN	B	1	900 CABLE U
9002003	SPRING RETAINING LAMP	A	1	
9002004	SPACER LENS GLASS	B	6	
9002015	DIAPHRAGM LOWER LENS BLOCK	A	1	
9002016	LOWER LENS BLOCK SECTION 1	A	1	
9002017	LOWER LENS BLOCK SECTION 2	A	1	
9002026	STANDOFF LENS HOLDER 1	A	1	
9002027	STANDOFF LENS HOLDER 2	A	1	

7340537-BOM Mechanical Pre Assembled Assembly

7340529 Mechanical Preassembled Robot rev G As of 10-12-01				
Item	Description	Rev	Qty	Remarks
14003	NUT HEX 4-40 STEEL	C	2	
16003	LKWSHR #6 HELICAL SPR SS	A	1	
16016	LKWSHR #8 HELICAL SPR SS	A	4	
17003	WSHR FL .156IDX.312OD	B	1	
17033	WSHR FLAT #4 .125X.250 SS	B	2	
17054	WSHR FL .188IDX.438ODX.049 SS	D	4	
18034	WSHR SPRING WAVE #4 SS	B	2	
19055	SCR SOCK CAP 6-32X5/8 BLK	A	1	
19059	SCR SET 6-32X1/8 NYLON TIP SS	B	2	
19107	SCR SOCK CAP 8-32X 3/8 SS	A	4	
19112	SCR SOCK CAP 4-40X3/8 SS	B	2	
19187	SEMS 4-40X1/4 ST PHIL ITOOTH	A	4	
49751	BEARING .312ID SNAP-IN TEP642	C	1	
66001	EPOXY	A	0	A/R
66039	GREASE, LINEAR WAY	A	0	A/R
7120576	OPTO SHORT LEAD ASBY	E	1	CABLE BC
7332028	SPACER TENSION ARM	C	1	
7340404	MAIN PCB W/ROBOT MTR DRV R ASBY	H	1	
7340523	GENERIC PRE-ASSEMBLED ASBY	G	1	
7340529-AS	-MECH PREASSEMBLED ASBY ROBOT	H	0	DOCUMENT ONLY
7340531	CABLE MOTOR LID LIFT ASBY	B	1	CABLE R
7342043	TIP LINEAR ACTUATOR	A	1	
7342050	HOME BLOCK ACTUATOR	C	1	
7342051	BRACKET ACTUATOR MOUNTING	A	1	
7342063	ROLLER ACTUATOR	A	1	

Field Change Notices and Service Bulletins

PURPOSE: These notices are to provide authorization and instructions for service centers to perform engineering changes (RETROFITS) to field units.

FCN's

Mandatory FCN's

FCN L0002: Add ground wire to ELx808 inc chamber to reduce noise.

CHANGE PRIORITY: Mandatory.

PURPOSE: Reader Would give 7xx Errors during an incubation/read function.

DISCUSSION: When the incubator is enabled, the top thermister was causing noise to be emitted into the analog measurement PCB. A ground wire was added to the reading chamber to reduce the noise. The wire grounds the reading chamber to the chassis ground.

MATERIALS REQUIRED:

Phillips Head Screw Driver, 7/64" Hex Wrench, Bio-Tek part # 8050529 ground wire.

INSTRUCTIONS:

- 1) Remove the seven screws that mount the top cover. Make sure the Plate carrier door is secured. It may swing open when the top cover is opened.
- 2) Remove the (7340402) analog PCB by unscrewing the four Phillips head screws. (use a static strap when handling the PCB.) Flip the PCB towards the back of the unit. Leave the cables attached to the PCB.
- 3) Remove the small square piece of foam. (7342037, item #4) from the top of incubator/reading chamber under the analog PCB. (Be very careful not to rip the foam. This may be difficult. Just go slow)
- 4) Reference drawing 7340514-AS, page 1 of 4. Remove the screw that is located behind the incubator. (This will require an Allen wrench that is 7/64 inches. (This screw holds a ground wire that is yellow/green striped and routes underneath the incubator. The wire is mounted in the front.)
- 5) Remove the wire. Pull the wire from the front of the unit to have it exposed. Remove the wire from the front lug.
- 6) Reference drawing 7340514-AS page 1 of 4. Install the new ground wire (Part # 8050529) by mounting the GN1 lug to the back of the incubator.
- 7) Route GN3 lead under the incubator towards the front of the unit. Mount this lead to the front lug that mounts the metal support bracket for the Analog PCB.
- 8) Route GN2 to the top of the incubator. Mount GN3 lead to the right side of the thermister. (Refer to drawing 7340514-AS page 4 of 4.)
- 9) Replace the square foam piece that covers the top thermister.
- 10) Replace the analog PCB. The PCB is self aligning.
- 11) this installation is complete.

ECN L0003: Change to new bulb connector for ELx808.

CHANGE PRIORITY: Mandatory

PURPOSE: Reader would fluctuate with readings during a kinetic read.

DISCUSSION: The readings would fluctuate during a kinetic read. The bulb connector was not the correct size for the size of the cable used. This would cause an intermittent contact. A new connector has been added to the bulb connector (Cable J) This new connector makes a better contact to the cable.

MATERIALS REQUIRED:

Phillips Head Screw Driver, 7/64" Hex Wrench, Bio-Tek Part # 7340506 (Lamp Cable Assembly.)

INSTRUCTIONS:

- 1) Remove the screws holding the top cover. Lift the top cover. (Support the plate carrier door to prevent it from opening rapidly and being damaged.)
- 2) Remove the Lamp cable from the Main PCB and the Lamp.
- 3) Replace with the new Lamp cable (7340506).
- 4) The installation is complete.

ECN L0006: ELx808 base code upgrade to V 2.14.

CHANGE PRIORITY: Mandatory

PURPOSE: 7340202-FW, Version 2.14 upgrade for all ELx808 readers.

DISCUSSION: The following changes to the Basecode were conducted:

- 1) When a user selects Point to Point curve fit and turn on Extrapolation, the results may be inaccurate. The extrapolation for point to point curve fit was being calculated incorrectly. A change to the base code calculates the extrapolation for Point to Point curve fit in an improved manner.
- 2) Improvements to the Formula menu. There was a problem with the formula having the input field having a fixed length. If the formula exceeded this length, the formula would get truncated.

MATERIALS REQUIRED:

- 1) Software Download utility (Bio-Tek Part # 8290206)
- 2) ELx808 Base Code, Version 2.14 (7340202)

INSTRUCTIONS:

- 1) Follow the instructions that are included with the Software Download Utility.
- 2) The procedure is complete.

FCN L0007: ELx808 R44 of Main PCB

CHANGE PRIORITY: Mandatory

PURPOSE: ELx808s hanging up during initialization when the printer is attached and turned on.

DISCUSSION: The ELx808 initialization routine hangs when the printer is turned on and attached to the instrument before the ELx808 is powered up. The problem was caused by a wrong component installed at R 44 on the 7340400 main PCB. The Resistor should be 2.49M. What was installed was a 2.49K. This resistor is used as a feedback for the Power Good.(PG) signal that is generated from IC U50. This signal is tied to the u-processor interrupt lines.

The PG signal must go high to remove the interrupt request. When the printer is installed and turned on, It caused a 0.7V level at the negative input of U50. This would cause the output of U50 to go low. When the instrument is power on, U50 would get locked into a low output condition. This signal going low would cause the interrupt line to be active and stalling the processor on power up.

CORRECTIVE ACTION: Verify if R 44, on the 7340400 main PCB, is 2.49K. If so, Replace R44 with a 2.49M resistor (Bio-Tek Part # 32158).

FCN L0008: ELx808 check install of R49 & 50 of Main PCB

CHANGE PRIORITY: Mandatory

PURPOSE: ELx808 Main PCB resistor rework

DISCUSSION:

Early models of ELx808 Serial or parallel port could become unstable causing the unit to fail to accept software download.

If you are installing new software into an ELx808 and the download fails, confirm that the Main PCB [pn7340400] has the R49 and R50 resistors installed per drawing 7340400-AS, Revision H.

This change took place at Bio-Tek on 11/7/95. All units manufactured after this date should have the resistors in place.

Units built between 11/7/95 and 4/2/96 may have resistor R50 lead attached to wrong side of Capacitor C18. Lead should be soldered to the top of C18 as depicted in 7340400-AS, Revision H.

INSTRUCTIONS

1. Reference Bio-Tek drawing 7340400-AS, Revision H. Observe that unit has the update installed and that R50 is correctly connected to the top leg of C18. If update has not been installed, proceed to step 2.
2. Install resistor R49 as described. BTI pn 32047, rating: 1.000K Ohm, 1%, ¼ Watt
3. Install resistor R50 as described. BTI pn 33074, rating: 68.1 Ohm, 5%, ½ Watt
4. Please note the serial number of the ELx808 and contact BTI to request these parts under warranty or if you have questions regarding this bulletin.

FCN L0018: ELx808 add spacer for photodiodes

CHANGE PRIORITY: Mandatory

PURPOSE: ELx808s giving random errors 700, A00, 900.

DISCUSSION:

The original photodiodes of the early versions of the Analog PCB used nylon spacers (Part # 16053) to isolate the photodiode case to prevent shorting to the through holes of the PCB. Approximately a year ago the spacers were removed. We recently discovered that random errors (700, 900, A00) were being caused by photodiode case shorting to the PCB through holes.

CORRECTIVE ACTION:

Rework all 7340525 analog PCBs when the units are returned for service per Engineering Change Order # 30825. The nylon spacer is to be placed under each photodiode to prevent shorting.

PARTS REQUIRED:

QTY: PART DESCR. BTI PART #

9	Nylon washer	16053
1	ELx808 Service Manual	7341004
1	ESD wrist strap and grounding cable	
1	Solder Station	

INSTRUCTIONS:

1. Remove the 7340525 Analog PCB from the Instrument (Use electrostatic discharge precautions when handling the PCB.)
2. Unsolder each photodiode and place the 16053 nylon washer under the photodiode. Solder the photodiode back into the same through hole. (Remember to add the spacer to the reference channel photodiode as well.)
3. Install the 7340525 Analog PCB into the instrument.
4. Perform the Auto Calibration procedure to re-align the optics.
5. Perform the Performance testing outlined in the ELx808 service manual
6. End of Procedure

FCN L0025: ELx808I & IU mods to prevent 0700 errors when operating on low AC.

DISCUSSION: The current design is susceptible to low AC line conditions. At the low AC condition, the power supply AC ripple is passed through to the analog power supply. When the incubator is in a full duty cycle to heat the chambers, this loads the power supply. If the AC line voltage is in a low condition and the Incubator is at a 100% duty cycle, the instrument to give error 0700 on the display during power up initialization.

ACTION REQUIRED: The minimum revision for the Main PCB, BTI Part Number, is Rev D. All instruments returned for service should be checked and updated as required to ensure this PCB is at Rev D or greater.

FIELD CHANGE PROGRAM/PROCESS

Existing Stock of 7340406 Rev C or Lower and/or 7340400 PCBs should be returned to Bio-Tek Instruments USA for a replacement 7340406 Rev D or higher PCB.

Dealer service centers will be supplied with retrofit kit (Part # 7340024) so they can re-work the Main PCB for instruments when the PCB is not up to Rev D. Follow the instructions below to perform this update.

PARTS REQUIRED

ITEM NUMBER	DESCRIPTION	QTY	SUPPLIED BY
*7340024	Service Kit Power Supply Retrofit	1	Bio-Tek
	Solder Iron	1	Dealer / Repair Center
	Solder	1	Dealer / Repair Center
	Flat head Screw Driver	1	Dealer / Repair Center
	Phillips Head Screw Driver	1	Dealer / Repair Center
	Needle Nose Pliers	1	Dealer / Repair Center
	2.5mm Hex head Wrench	1	Dealer / Repair Center
	5mm or Socket Wrench	1	Dealer / Repair Center
	Antistatic Matt and ESD Wrist strap	1	Dealer / Repair Center

* The 7340024 Retrofit Kit includes the following.

Item Number	Description	Qty
7342034	Mounting Bracket	1
9440500	944 Cable GA, 3 Pin connector	1
71027	Bus Wire	.16FT
49552	Thermal isolator Pad	1
23021	Voltage Regulator +Adju 1.5A	1
19112	Screw Socket Cap 4-40x3/8 Stainless	1
18008	Washer Flanged #4 Nylon	1
15005	Nut, Keps 4-40	1
15003	Locknut, 6-32 Stainless	2
12077	Screw Socket Cap 6-32x1/2 Stainless	2

CHANGE INSTRUCTIONS:

Main PCB Rework Instructions:

1. Remove the power cord from the power receptacle.
2. Remove the seven screws that mount the top cover to the base. This requires the flat head screwdriver.
3. Open the top cover and remove the filter wheel and place it in a protective bag.
4. Attach an E.S.D. wrist strap that is grounded to the wall outlet before handling the Main PCB. Remove the nuts mounting the serial and printer ports. Remove the main PCB by unscrewing the five (5) Phillips head screws. Be careful not to drop the nuts into the base pan. Tag each cable for the correct J connector. This will help you when re-installing.
5. Using the soldering iron, remove R46 and U9.

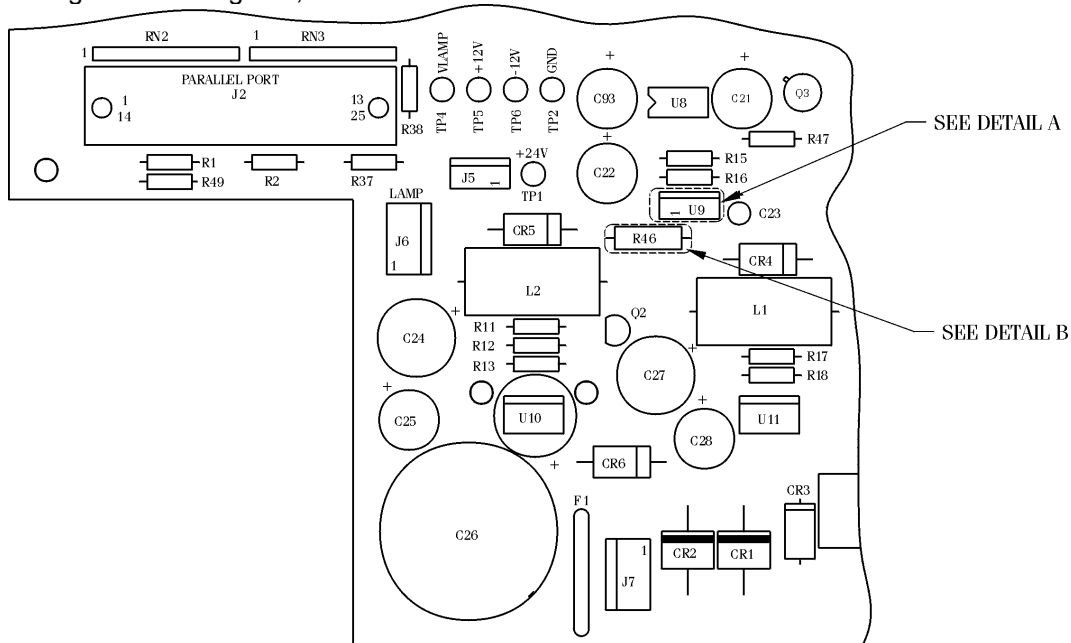
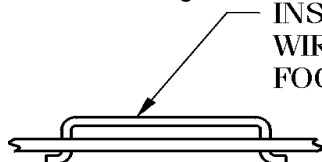


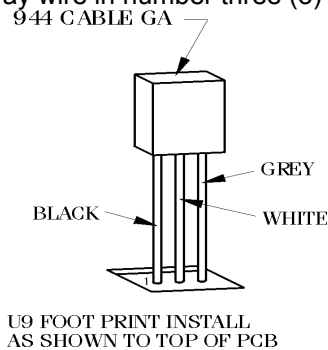
Figure #1

6. Add the buss wire to the R49 through holes. Solder the buss wire
**INSTALL 71027 BUSS
WIRE IN F1 AND R46
FOOTPRINT AND SOLDER.**



DETAIL B

7. Remove the 944 cable from the supplied heat sink assembly (Note the orientation of the connector). Solder the cable to the Main PCB in the U9 location. Black wire in the number one (1) pin. White wire in number two (2) pin and Gray wire in number three (3) pin.



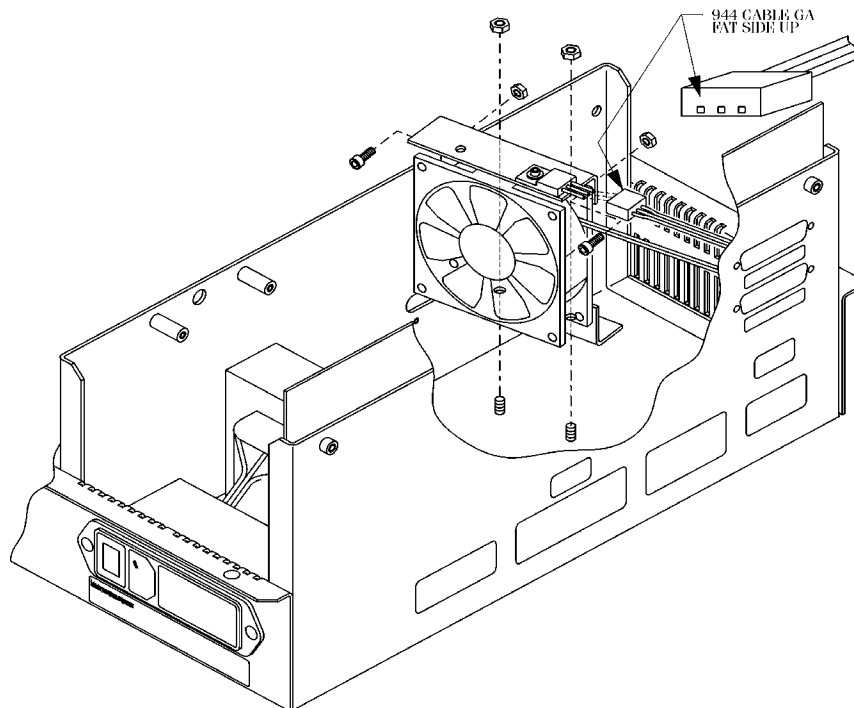
DETAIL A

Power Supply Retrofit Kit Installation:

1. Mount the heat sink assembly to the top of the fan housing. Refer to the assembly drawing showing the fan.

2. Re-install the 7340406 Rev D main PCB. Tighten all the screws. Remember to tighten the screws that mount the serial and printer ports. Re-install all the cables to the main PCB.

3. Plug in the 944 cable to the regulator on the heat sink assembly. Note the orientation of the cable as shown on the assembly drawing.



4. Re-install the filter wheel. And then mount the top cover to the base.
5. Plug the AC power cord into the receptacle. Power up the instrument. Verify the instrument passes the Initialization and self test.
6. Attach a printer to the reader. Perform the system test and verify the results pass.
7. End of the retrofit procedure.

FCN L0027: Base code update for memory corruption problem

PURPOSE: to provide authorization and direction for service centers to update instruments as described by this notice.

DISCUSSION:

1. The base code for the listed products were updated to the versions shown to fix a software bug that corrupts instrument memory:

ELx800 7330202 Version 2.88 Revision R
ELx808 7340201 Version 2.88 Revision M
ELx405 7100201 Version 1.14 Revision G
ELx50/8/12 4070201 Version 1.02 Revision B
Elx50/16 4070230 Version 1.06 Revision C
MQX200 7270201 Version 1.09 Revision E
PowerWave 200/340 7260201 Version 1.21 Revision H
PowerwaveX 200/340 7260201 Version 1.21 Revision H
PowerWave Select 7260216 Version 1.03 Revision C
FLX8007080201 Version 1.04 Revision C
2. The readers and washers listed may experience a memory corruption in which user set parameters and/or system parameters are modified or overwritten. This will cause the reader or washer to give errors and behave erratic.
3. The base code software is the instruments operating system. This software uses a memory manager tool that was discovered to have a bug in the code. This bug would cause the program counter to loose its place. This would then corrupt the areas of memory where the user definable parameters are stored. A fix to this base code ensures the program counter does not get corrupt.
4. The following errors can be encountered:
 - 4.1. ELx800: Filter table would have negative wavelengths and or invalid wavelengths. Instrument would give an error 0F0x. If the Assay parameters were modified, an error A400 error would be displayed. Front Panel lockup.
 - 4.2. ELx808: Filter table would have negative wavelengths and or invalid wavelengths. Instrument would give an error 0F0x. If the assay parameters were modified, an error A400 error would be displayed. No serial port communications. Random noise errors 0700 or 0900. Front Panel lockup.
 - 4.3. MQX200: Filter table would have negative and invalid wavelengths. This would cause a 0403 error. The Monochromometer would be forced to an invalid wavelength location and would not calibrate. Front Panel lockup.
 - 4.4. PowerWave200/340: Filter table would have negative wavelengths and or invalid wavelengths. Instrument would give an error 0403 or 0303. No serial port communications. Random noise errors 0700 or 0900. Front Panel lockup.
 - 4.5. PowerWaveX200/340: Filter table would have negative wavelengths and or invalid wavelengths. Instrument would give an error 0403. No serial port communications. Random noise errors 07xx or 09xx. Front Panel lockup.
 - 4.6. ELx50/8,12,16: An assay configuration checksum error would occur. This error is A5xx or A4xx.
 - 4.7. ELx405: An assay configuration checksum error would occur. This error is A5xx or A4xx.

5. Please contact Bio-Tek Instruments for assistance in determining whether the instrument is exhibiting a memory corruption.

CORRECTIVE ACTION:

1. Dealers and Service Centers should update the Base-code (to the current version or higher) and the Assay Configuration Files (See Note below) when the instrument is in the service depot or during field service.
2. The base code can be copied from the Bio-Tek Web site www.biotek.com. Get into the Laboratory Products module. Click on the "Download" field. Fill in all the information in the form and submit. This will bring you to a screen with the list of base code files. You can also get a copy of the latest download utility file.

Note: Only download the Assay Configuration files when there is evidence of the FLASH memory is corrupt. When re-downloading the Assay Configuration files, the customer programs will be over written. Please inform your customers of this before the Assay Configuration files are reloaded. Contact Bio-Tek to obtain a copy of the Assay Configuration Files. The Assay Configuration part number that is loaded on the instrument can be found by pressing the keys: UTIL, TEST, CHKSUM. Please have this part number when requesting the proper Assay Configuration Files.

PARTS REQUIRED:

QTY	DESCRIPTION	BTI PART #	SUPPLIER
1	Download utility	8290006	Dealer
1	Serial Cable Null Modem	75053	Dealer

INSTRUCTIONS

1. Verify which base code part number and version is currently installed on the reader or washer by pressing the following keys on the instrument keypad:
UTIL, TEST, CHKSUM.
2. Attach the 75053 cable between the reader / washer and the PC used for the download.
3. Follow the procedure for downloading the base code in the service manual or in the instructions provided in the 8290006 Download Utility kit.
4. If memory corruption is suspected, verify the Assay Configuration Part number and version. (See Note above) Download the Assay Configuration files using the steps outlined in the Download Utility procedure.
5. Procedure completed.

Non-Mandatory FCN's

FCN L0001: ELx808 front panel grounding change

PURPOSE: This notice is to provide authorization and instructions for service centers to perform engineering changes (RETROFITS) to field units.

DISCUSSION: The ELx808 front panel overlay has a ground plane for protection against electrostatic discharge (ESD). The overlay has a ground strap that is grounded to the ELx808 chassis. The top shroud of the ELx808 has a conductive coating on the inside. This coating is to channel the ESD to earth ground. The overlay grounding strap makes contact with the conductive coating. This is not a good mechanical connection. An Engineering Change was added to ensure the overlay ground strap would make contact with the conductive coating.

MATERIALS REQUIRED:

Tape, Double sided (Bio-Tek Instruments Part # 49173)
Flat head screw driver.

INSTRUCTIONS:

- 1) Remove the seven screws that mount the top cover. Make sure the Plate carrier door is secured. It may swing open when the top cover is opened.
- 2) Open the top cover and let it rest in the full open position.
- 3) Viewing the top cover interior, The overlay cable is found in the middle of the top cover. It is a Black flex cable that sits just below the Plate carrier door. (Refer to the 7340005-AS, Rev L)
- 4) Using the Double sided tape (49173), Place a strip across the flex cable to help secure it to the conductive coating.
- 5) This completes the Overlay ground strap upgrade.

FCN L0004: ELx808 op amp change.

CHANGE PRIORITY: Discretionary

PURPOSE: 7340402 Analog PCB with TL074C and TL072C amplifiers.

DISCUSSION: The analog PCB (Part # 7340402) was manufactured with TL074Cs and TL072Cs. The correct components are TL072BC and TL074BC. These components were incorrect for offset specifications. These components would cause the dark current offset to have readings above 10000 counts for the noise test. This would cause an 800 error. if the unit under test is giving 800 errors.

MATERIALS REQUIRED:

7340402 Analog PCB. (If needed.)

INSTRUCTIONS:

- 1) Remove the screws holding the top cover. Lift the top cover. (Support the plate carrier door to prevent it from opening rapidly and being damaged.)
- 2) Unscrew the four screws mounting the Analog PCB to the measurement chamber.
- 3) Flip the Analog over and verify the TL072 and TL074 components are a BC variation and not the "C" variation.
Note: Use the ESD handling procedure when handling the 7340402 PCB. This is a static sensitive device.
- 4) If the PCB has the correct components, re-install the PCB.
- 5) If the component are the "C" variation, Replace the Analog PCB (7340402).
- 6) The procedure is complete.

Service Bulletins

LSB00-01: ELx808R Lubrication requirements

DISCUSSION:

- This bulletin relates to Robotic versions of the ELx808 product family
- The robotic door assembly requires lubrication to ensure the longevity of the stepper motor inner bushing that drives the plunger to open the door. Without the lubricant, the brass inner bushing will wear causing the door to not reach it desired set position over time.

PARTS REQUIRED:

ITEM NUMBER	DESCRIPTION	QTY	SUPPLIED BY
66039	Grease, Linear Way	1	Bio-Tek

PERIODIC MAINTENANCE PROCEDURE

- The following information pertains only to periodic lubrication of ELx808 robotic units.
- Lubricate the components shown in Figures 1 and 2 every six months, or after 10,000 cycles, according to the following instructions.

Component Location	Procedure
A	Lubricate the underside of the bracket.
B	Lightly lubricate the shaft indicated.
C	Apply a heavy coating of lubricant to both sides of the motor shaft. Run the motor shaft back and forth through the motor to ensure that the internal drive nut is heavily lubricated. Use the robotics motor adjustment procedure provided below to work the lubricant into the internal drive nut.
D	Lightly lubricate the surface of the roller.
E	Lightly lubricate the underside of the hook-in bracket.

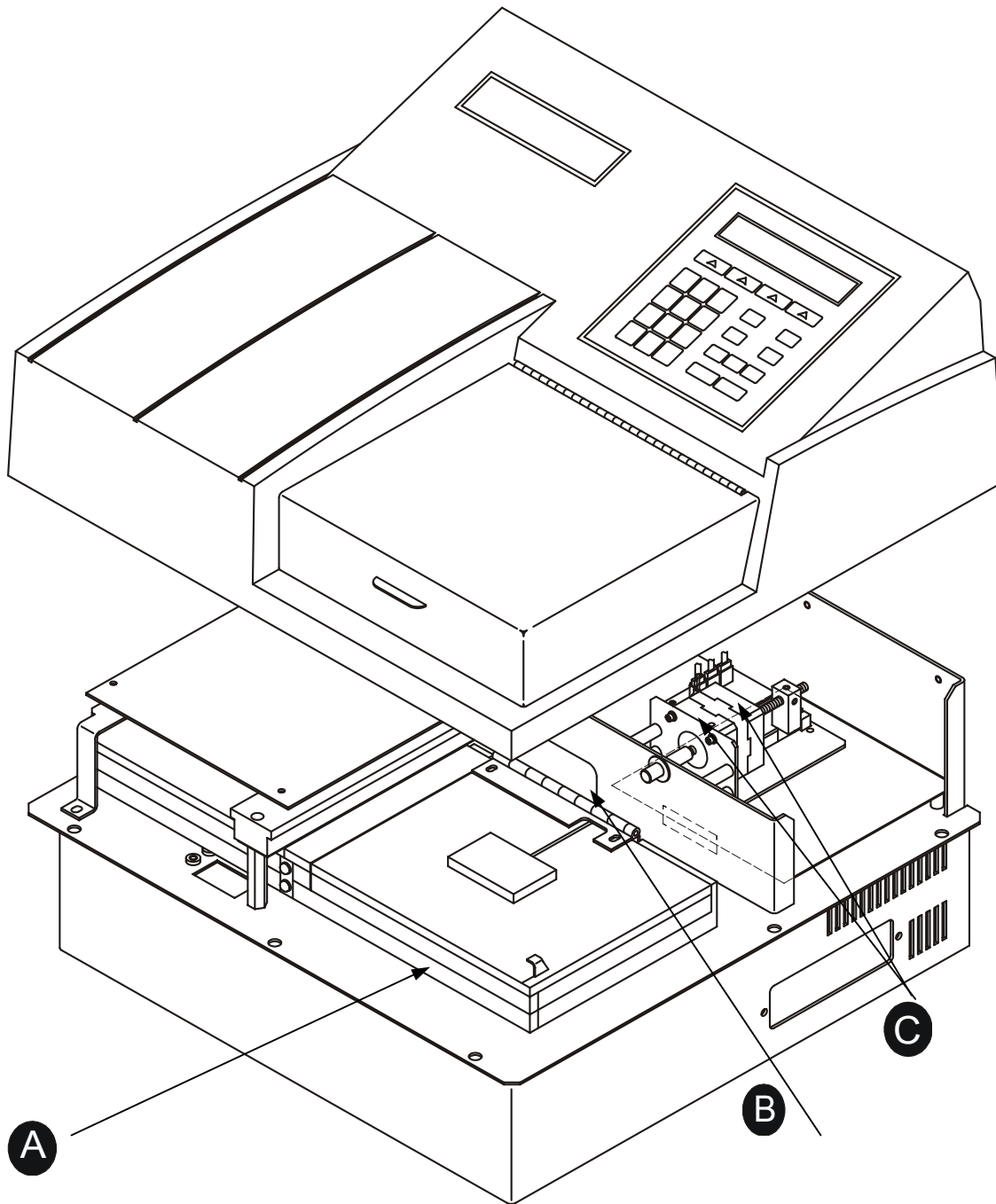


FIGURE 1

NOTES:

1. USE LUBRICANT BTI P/N 66039

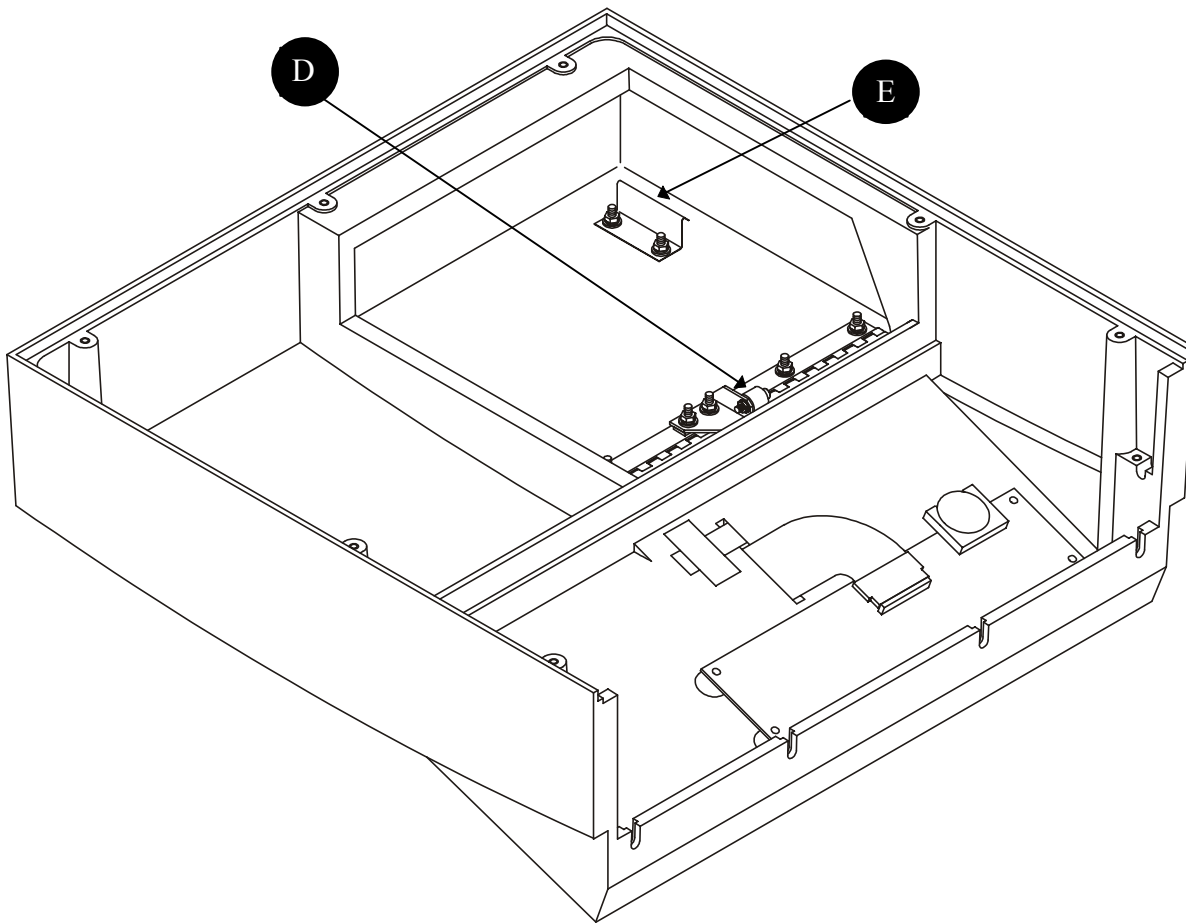


FIGURE 2

Reassemble the shroud.

After lubrication/re-assemble, the robotics door needs to be set to the open and closed positions. Press the following keys to adjust the door. At the Main Menu:

1. Press the UTIL soft key, then press the Setup soft key, then press the hidden key between the Main Menu and Previous Screen keys. You should see the Door Adjustment screen.
2. Press the CLOSE soft key, then press the UP soft key until you just see the door move up. You may have to press the key many times before the door moves.
3. After the door moves, press the DOWN soft key 4 times. This positions the door lift ram just behind the door roller in the closed position.
4. Press the OPEN soft key.
5. Press the UP soft key to raise the door to the desired height. Press the DOWN soft key if you want to adjust the door downward.
6. Press the CLOSE soft key. This will close the door. The door should rest closed on the top shroud.
7. Press the Main Menu key.

Service Procedures and Download Utility

This section contains the Service procedures used in testing the ELx808 Automated Microplate Reader and its variations. These documents are subject to change.

PART NUMBER	DESCRIPTION
7340005-ST	Final asby Service Procedure
7340005-SD	Final asby Service Data Sheet
8290006 Kit (8291007-AW)	Download Utility Instruction Document

C O N F I D E N T I A L

Bio-Tek Instruments, Inc.

Model: Elx808 and Variations

Procedure: 7340005-ST

Title: Final Asby Service Test Procedure

Rev	Description of changes	ECO	Date
A	Release To Production	29166	04/30/97
B	Add blank carrier test	30815	07/10/98
C	Page 1: Correct Documentation	30879	07/28/98
D	Updated to new format	35428	09/25/01

Equipment Required

(X) -Requires Listing On The "Lab Product Equipment Calibration Data Form" Specified On The Data Sheet.

- A PC (486 min) with a 1.44mb 3.5" floppy drive, 2 COM ports , mouse and 16 megs of ram minimum.
- Windows 95 installed on the above PC (including Microsoft EXCEL Rev 7.0 or higher).
- Serial Cable (part # 75053)
- Parallel Cable (part # 71072)
- Any parallel printer with paper
- Auto-calibration Jig (part # 7332508)
- Firmware (see Bill of Material for what is required for the assembly being tested)

(X) -Universal Test Plate (part # 9000547) with DATA (Serial number 113400 or higher)

(X) -Digital Thermometer with +/- 0.5 degrees C accuracy including the thermistor lead.

-KCjr or KC3 / KC4 Software (part # 5270500, 5260500)

(X) -HP 34401A Multimeter (or equiv.)

Procedure

1. Perform the decontamination procedure as outlined in the ELx808 Operators manual (Appendix A).
2. List all accessories received with the instrument. If the instrument was not shipped with all the shipping accessories, list the missing items on the receiving report sheet (SF1.FRM).
3. Record the instrument AC voltage settings on the data sheet. If the AC voltage needs to be changed, perform the AC voltage selector modification as outlined in the ELx808 Operators manual
4. Remove the seven screws holding down the top cover. Lift the top cover until it is fully open.
Remove the filter wheel, from the packaging. **(Do not touch the filters with your fingers.)** Record

the filter wavelengths on the data sheet. Install the filter wheel. Check the Time of Day battery located on the display PCB. If the date code on the battery is six years or more, change the battery. Close the top cover and place two mounting screws in the front to secure the cover.

Note: Inspect the ribbon cable between the display PCB and the main PCB before closing to ensure the cable did not get unplugged when the cover was opened.

5. Power up the instrument. Allow the instrument to initialize. The EPROM version is displayed on power up. Record this information.

5.1 At the main menu select “**UTIL**”, “**TESTS**”, then “**CHKSUM**”. Record the Base code and Assays.

6. At the main menu select “**UTIL**”, “**SETUP**”, then “**FILTER**”. Record the programmed filter locations.

7. At the main menu select “**UTIL**”, “**SETUP**”, “**More**”, then “**RS232**”. Record the Baud rate.

At the main menu select “**UTIL**”, “**OUTPUT**”. Record the output status.

8. Perform a System Test.

The optics test checks the function of the analog front end. Press the following soft keys to produce a printout. Align the printer to the top of a page at this point.

Press the UTIL soft key.

Press the TESTS soft key.

Press the SYSTEM soft key.

At this point the instrument will perform an internal optics test and report the results to the printer. The last line of the print out should say SYSTEM TEST PASS. Verify the Pass/Fail criteria, outlined in the data sheet are met. If the test failed check the following.

Is the filter wheel installed?

Are the filters installed in the right positions?

Are all the photodiodes in correctly and soldered?

Are the primary optics assembled correctly?

Is the reference channel fiber optic spray in place?

9. Blank Carrier Reads:

Perform a 405nm and 340nm (for UV instruments only) read with no plate in the carrier. This can be performed by using the onboard software or a KC4 / KCjr for Windows program to task the reader at the wavelengths while blanking on air.

10. Universal Test Plate Read:

Perform a read at all filter wavelengths using the 9000547 Universal Test plate. This can be performed by using the onboard software or KC4 / KCjr for Windows Universal Test plate program. Refer to the ELx808 Operators manual for setting up the Calibration values and performing the test. Refer to the KC4 / KCjr for Windows help files for setup and execution.

Note: If the customer has a wavelength that is not listed on the standard data sheet, Omit this filter for testing.

11. Cleaning and alignment. (Refer to Chapter 4 of the Service Manual (7341004) Revision B or higher)

- 1) Disassemble the instrument to the lower lenses. Use filtered air to blow out the lower lenses. If not able to clean, replace the lenses with BTI part # 3402004.
- 2) Remove the upper lens block and verify cleanliness. Disassemble the upper lens block and clean the lenses with lens paper or a lens cleaning kit.
- 3) Remove the carrier rail and clean with isopropyl alcohol.
- 4) Replace the belt if dry to the touch, or if belt is cracked.
- 5) Clean all surfaces possible, verify photo diodes are clean and clear of fingerprints.
- 6) Remove the lamp assembly and verify proper alignment. If the system test gain value for the 405nm filter is greater than 16 or the lamp has over 500 hrs of use, replace the lamp. (Part # 3400508)

12. Reinstall and align all the assemblies. Align the plate carrier read holes with the lower lens block where the lower lens block holes are centered to the plate carrier holes. Tighten the plate carrier assembly screws. After installing the upper lens block.

13. Using a white piece of paper over the upper lens block, Verify the light passing through each channel is not obstructed.

14. Conduct all necessary repairs.

15. Perform all Field Change Notices (FCN) and Service Bulletins.

16. Check all the hardware for tightness. Replace broken, rusted, or missing parts.

17. If required by an Engineering Change Order or requested by the customer, update the instrument to latest version of the Basecode and Assay Configuration using the Field Software Download Procedure 8291007-AW. Record the information on the data sheet.

(Inform the customer that the programmed wash routines will be erased when the new Assay Configuration files are loaded.)

18. Perform the auto-calibration procedure:

The Auto-calibration procedure establishes an accurate well location map for each reader. This is necessary because each instrument is slightly different. Press the following keys to run the AUTOCAL procedure from the instrument main menu.

Press the UTIL soft key.

Press the SETUP soft key.

Press the # 1 hidden key (located between the CLEAR and ENTER keys)

Follow the prompt on the display to remove the filter wheel from the instrument. Install the 7332508 AUTOCAL jig (A1 in upper left) and press the READ key. The carrier will move into the read chamber and the AUTOCAL will be performed. When the AUTOCAL is completed, the printer will print out the Auto Cal results. Press the Main Menu key. Remove the Autocal jig and replace the filter wheel.

19. Incubator verification. (For incubator units only.)

At this point the incubator in "I" instruments will be switched on to a 37 degrees C. set point. This is done automatically by running AUTOCAL. The incubator will reach set point in about 10 minutes. Verify that the UUT display reads 37.0 degrees +/- .2 degrees. Place an electronic thermometer in the carrier to verify the temperature is 37.0 degrees within the read chamber. Verify that the external thermometer reads between 36.5 and 37.2 degrees.

Verify the INCUBATION TEMP screen appears by pressing the following key sequence:

DEFINE

OPTION key until

(assay 02 appears)

ENTER (2 times)

METHOD

ENTER (2 times)

Verify that the INCUBATION TEMP: screen appears

Mark the data sheet to show that the incubator has been checked.

Press Main Menu once.

20. Repeat steps 8 through 10 of this procedure.

21. Robot door adjustment. (For robot units only)

Press the following keys to adjust the door. At the main Menu:

Press the **“UTIL”** key.

Press the **“Setup”** key.

Press the hidden key between the Main Menu and Previous Screen Keys
you will see the Door Adjustment screen.

Press the **“CLOSE”** key.

Press the **“UP”** key until you see the door move up. You may have to press the key many times before the door moves. When the door does move press the **“DOWN”** key 4 times. This positions the door lift ram just behind the door roller in the closed position.

Press the **“OPEN”** key.

Press the **“UP”** or **“DOWN”** key repeatedly until the bottom of the door is at the seventy (70) degree angle.

Press the **“CLOSE”** key. The door should rest closed on the top shroud.

Press the Main Menu key.

22. Verify serial port performance. Task the reader to perform a read and send data back to the IBM compatible computer. Use Appendix B in the Operators Manual to guide you.
23. Set serial port and computer controlled parameters back to original settings.
24. Remove the filter wheel from the instrument and place it in a protective shipping container or envelope. Secure the top shroud with the seven mounting screws.
25. Ensure all accessories noted are sent back with unit.

Note: For Bio-Tek Instruments demonstration units, complete the demo checklist.

26. Set the AC voltage selector to the original voltage setting. (If modified in step # 3)
27. Attach all data and Data Sheet to the Job Sheet.
28. This completes the service procedure.

Bio-Tek Instruments Inc.**MODEL: __ EL __ ELX 808****TITLE: SERVICE DATA SHEET****PROCEDURE: 7340005-SD****SERIAL #**

Rev	Description of changes	ECO	Date
A	Release to Production	29166	04/30/97
B	Added blank carrier test	30815	07/10/98
C	Steps 6,8,15: Correct Documentation	30879	07/28/98
	Update to conform to new format	3 5 4 2 8	0 9 / 2 5 / 0 1

For Page 1&2 use,**“Lab Product Equipment Calibration Data”(C of C) Form: SF8****NOTE: Technician to complete form and mark "Uncertainty of Measurement" as 2 : 1 For Optical Density.****Reference Procedure: 7340005-ST REV__**

Note: The Following Steps Correspond To The Order Of Steps On The Service Test Procedure. (1) Attach ALL Printouts To The Back Of The Data Sheet. (2) Check Correct Model At Top Of Page.

Para	Item	Results/Limits
1.0	Decontaminate the Instrument	___ Completed
2.0	List all accessories received on the SF1.FRM Receiving Report	___ Completed
3.0	Record the AC Voltage setting	_____ AC Voltage setting
4.0	Record the Filter Wheel information and install into the instrument Check Time of Day clock battery. If over six (6) years, replace it with part # 47049. Make sure the battery is marked with the installation date.	Record Filter Wheel: <u>Filter Wavelength</u> <u>Pos</u> 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____
5.0	Record the EPROM information	_____ EPROM version
5.1	Record the Basecode and Assay Configuration information	Record Base Code Loaded _____ BaseCode _____ Version Record Assay Def. Loaded _____ Assay Config _____ Version
6.0	Record the Programmed filter locations as received	Record Programmed Wavelengths: <u>Filter</u> <u>Wavelength</u> 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____

7.0	Record the RS232 port Information	Baud Rate: _____ Character Bits: _____ Parity: _____ Stop Bits: _____
8.0	Perform a System Test	____ Pass ____ Fail * See Below*
* System Test 1) Printed Gain Values Must Be Over 1.4 For All Filters. 2) 405nm Gain Values Must Not Exceed 16.00. 3) 340nm System Test AIR less Dark must be more than 16000 REF: "DELTA" (UV Instruments Only). 4) Noise Signal Range (difference between two numbers) Must Be Less Than 12 Counts. 5) Both Noise Signal Range Numbers Must Be Between 20-9500 6) Signal Delta For Channels 1-8 Should Be Between 30000 And 56000. 7) Signal Delta For Reference Channel Should Be A Minimum Of 15,000 On All Wavelengths Except 340nm.		
9.0	Blank carrier reads. All Wells Will Be 0.000 +/- .001	____ Pass ____ Fail
10.0	Universal Test Plate reads	____ Pass ____ Fail
11.0-12.0	Cleaning and Alignment	____ Completed
14.0	Light Beam check	____ Pass ____ Fail
15.0	Perform all Field Change Notices.	____ Completed
16.0	Check all hardware for tightness, Replace broken, rusted and missing parts	____ Completed
17.0	Update the Basecode and Assay Configuration files (Contact the customer to inform them of the loss of programmed assays)	New Base Code Loaded (____ ✓ N/A) _____ Base Code ____ Rev. _____ Version Record Assay Def. Loaded (____ ✓ N/A) _____ Assay ____ Rev. _____ Version
18.0	Perform the Auto-Calibration Record Delta Readings -792 +/- 32 Counts	Delta 1 _____ -760 - -824 Delta 2 _____ -760 - -824
19.0	Incubation Verification	UUT _____ 36.8-37.5 °C Thermometer _____ 36.5-37.5 °C ____ Pass ____ Fail ____ N/A (non-incubator units)
20.0	Repeat Steps 8 – 10	____ Pass ____ Fail
21.0	Robot door adjust (adjusted to 70 degree angle)	____ Completed
22.0	Serial Port Verification	____ Pass ____ Fail
23.0	Reset Serial Port Parameters to original settings	____ Completed
24.0	Remove Filter wheel from instrument and place is protected packaging	____ Completed
25.0	Accessories re-packaged	____ Completed
26.0	AC voltage set back to original settings	____ Completed
27.0	Data and Data Sheet attached to Job sheet.	____ Completed

I HEREBY CERTIFY THAT I HAVE REVIEWED ALL ACCEPTANCE DATA AND HAVE VERIFIED THE PRODUCT MEETS AND EXCEEDS ALL SPECIFICATIONS.

Name.

Title

Date

C O N F I D E N T I A L

Bio-Tek Instruments, Inc.

Model: ELX800, ELx808, PowerWave, uQuant, ELx405, ELX50 and all variations of each

Procedure: 8291007-AW

Title: Field Software Download Procedure

Rev	Description of changes	ECO	Date
A	Release To Production	28381	11/19/96
B	Updated DLOAD commands; Add procedure for loading ASSAY CONFIG; Add ELX50 and PowerWave information	29671	08/05/97
C	Change PoweWave References	29972	10/21/97
D	Add Filter Table note; add reference to μ Quant	31209	10/21/98
E	Add Ref to ELx405;Remove Assay from Text	32306	04/06/99
F	Add Ref to ELx50/16 Software	32679	08/10/99

Equipment Required

A PC (386 min) with a 1.44mb 3.5" floppy drive, 1 COM port minimum, mouse and 4 MB RAM

Windows 3.1 or Windows '95 installed on the above PC

75053 Null Modem Serial Cable

8290206-FW Download Utility

Instrument Basecode and Assay Configuration Software Diskettes (see About This Document, below)

Special Notes:

- 1) We may refer to the Elx800, ELx808, PowerWave, μ Quant, ELx405 or Elx50 as the "Instrument" throughout this procedure
- 2) The purpose of this Download Utility is to allow field upgrading of reader and washer software. If Extensions: Define Protocol (BTI P/N 8290501) is installed on your computer, this Download Utility should not be installed. Uninstall the Define Protocol before using the utility.
- 3) When updated software is downloaded onto the Instrument, any open assays that have been programmed on board the Instrument will be erased and will have to be re-programmed. Please print the assay definitions before

downloading new software. To do this, attach a printer to the parallel port of the Instrument, choose REPORT from the main menu on the Instrument, then press ASSAY and choose the programmed assay definition to print. This printout will detail all assay parameters, except any formulas which may have been defined. (The formulas are printed as part of the assay results report printout; refer to a hardcopy of an assay results report, or step through the define formula section from the front keypad to obtain the formula definition)

Note: The download process will set the reader's filter table to its original default configuration. The user must also check that the reader's filters and filter table positions match after the download. To check the reader's filter table, press UTIL->SETUP->FILTER->. Scroll through each of the filters programmed positions and compare to the physical position on the filter wheel. See reader's operation manual for instructions on how to access the reader's filter wheel.

- 4) When updated software is downloaded into the ELx50 or ELx405, existing programs are retained. The software download adds new programs to the existing programs on board the washer. In the event the user attempts to download too many assays for the washer program to store, an error message will be displayed during the download process.

About This Document

The ELx800, ELx808, PowerWave, μ Quant, ELx405 and ELx50 (all models) have two "levels" of software installed on board:

- 1) The Basecode software and
- 2) The Configuration software

All ELx800 instruments have the same *Basecode* software, part number 7330202-FW
All ELx808 instruments have the same *Basecode* software, part number 7340201-FW
All PowerWave instruments have the same *Basecode* software, part number 7260201-FW
All μ Quant instruments have the same *Basecode* software, part number 7270201-FW
All OEM ELx50 instruments have the same *Basecode* software, part number 4070201-FW
All other ELx50 instruments have the *Basecode* software, part number 4070230-FW
All ELx405 instruments have the same *Basecode* software, part number 7100201-FW

The *configuration* software part number is dependent on the model of the instrument. Contact Bio-Tek Instruments to obtain current software revisions and versions.

These two levels of software are loaded into the instrument's memory via a computer connected to the serial port of the instrument. This procedure explains the process for downloading both the Basecode and assay configuration software onto the instrument

To load the Basecode and configuration files follow **Procedure A** for Basecode and Configuration files. To load just the Configuration files, use the **Procedure B** for Configuration Download.

A. Loading the Basecode and Configuration files

1. Connect the instrument serial port to the computer COM port, using the 75053 null modem cable. *(If your computer has a 25-pin COM port, it will be necessary to attach a 9-pin to 25-pin adapter to the computer end of the cable)*
2. Turn the computer and instrument ON.
3. BASECODE DOWNLOAD: Insert the Basecode software diskette into the computer's floppy drive.

3.1. Get to the DOS a:\> prompt (or appropriate floppy drive prompt).

- 3.2. On the instrument, press the Shift and Hidden Key #1 simultaneously. (Hidden key #1 is between the 'CLEAR' and 'ENTER' keys).

The instrument display should read "START **CODE** DOWNLOAD?"

YES

NO

IMPORTANT: To properly load the Basecode software, the above message **MUST BE** displayed on the instrument. If "START ASSAY DOWNLOAD" is displayed, press NO and repeat step 3.2, making certain that Hidden Key #1 is pressed.

- 3.3. Select 'YES'. The instrument display will read "Clearing Download Area", then "Ready for Download"
- 3.4. At the computer DOS prompt, type **DLOAD** and press Return (↵). The Instrument display will read "DOWNLOAD IN PROGRESS". (if using a COM port other than COM1, Type **DLOAD x** (x indicates the COM port number.))

Examples: (COM1) Type **DLOAD**
(COM2) Type **DLOAD 2**

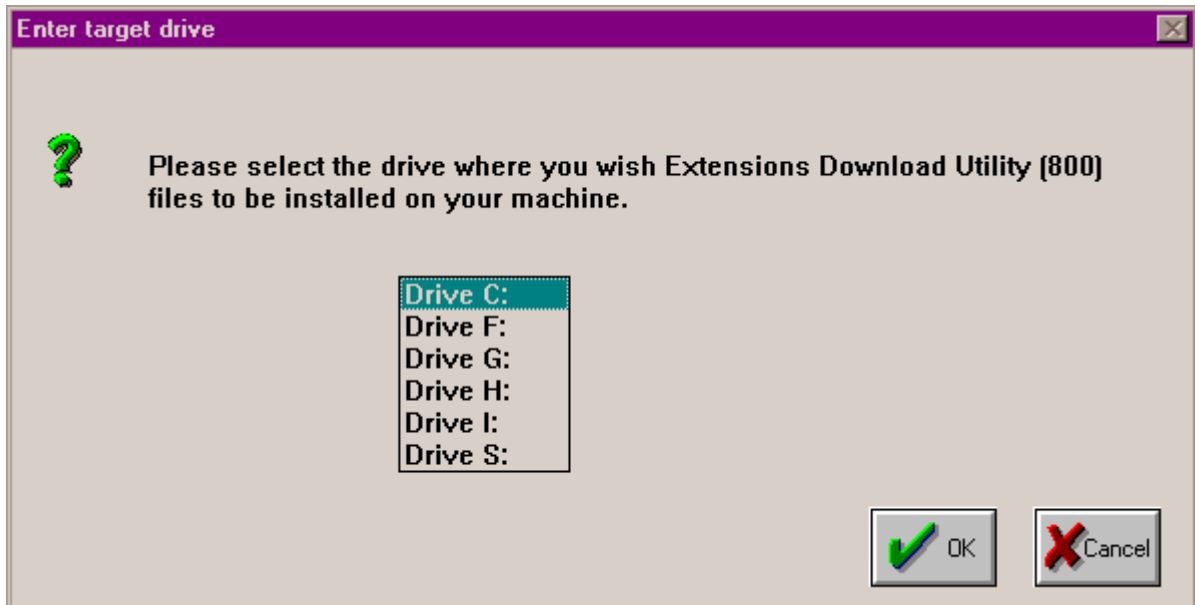
- 3.5. The computer will display: File size: 3000513 (may vary)
Bytes sent: xxxxxx (will be counting up)

- 3.6. The download will take several minutes. When complete, the computer will display "DOWNLOAD SUCCESSFUL!" The instrument will display *either* "START ASSAY DOWNLOAD", or will return to the Main Menu. Remove the Basecode diskette from the floppy drive.

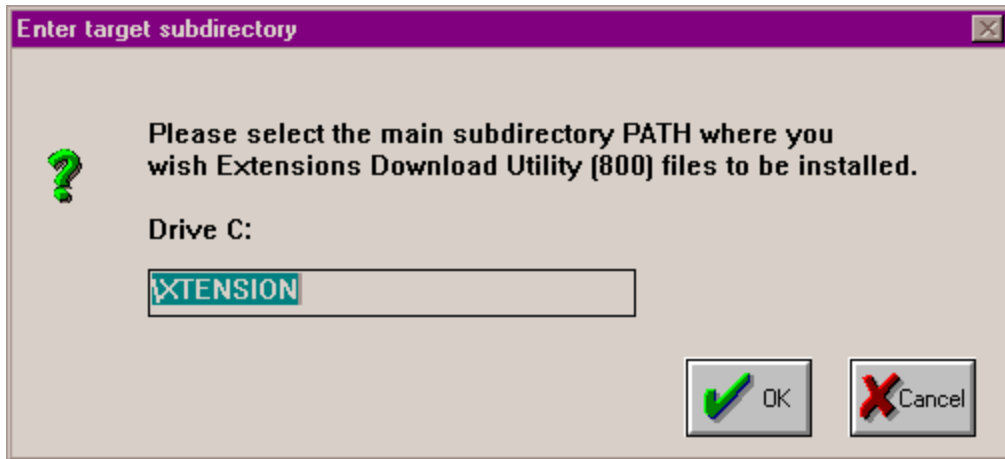
4. CONFIGURATION DOWNLOAD: This download is performed using the Download Utility Program, part number 8290206-FW. Start Windows 3.1 or Windows '95 on the computer.

Note: If the Download Utility is already installed on your computer, go to step 4.3

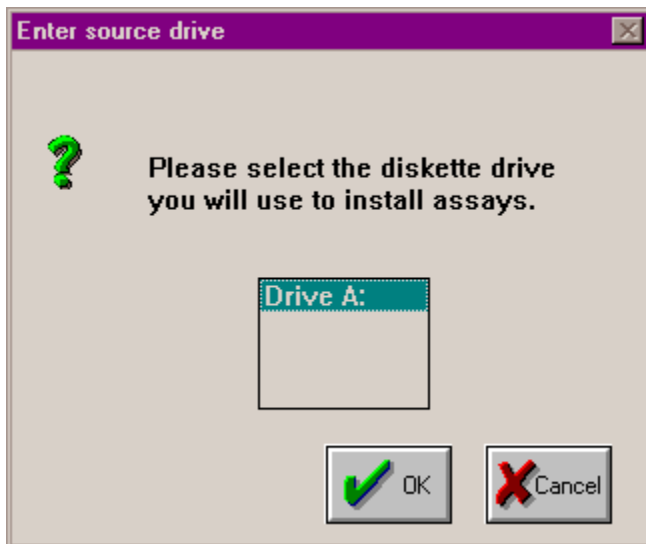
- 4.1. Install the Download Utility via the File Manager or Windows Explore.(Double click on the Download Utility's **Winstall.exe** file)
- 4.2. The install program will ask several questions - it is highly recommended that the user accept all the default settings in the installation process. Once the Winstall.exe is begun, you will see screens similar to those shown below:



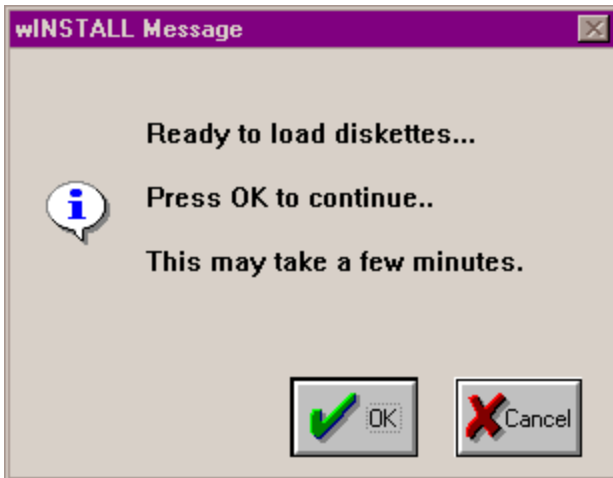
Select C: to install the Download Utility onto hard drive C:



The Download Utility will be installed in subdirectory C:\XTENSION, unless a different subdirectory name is entered.

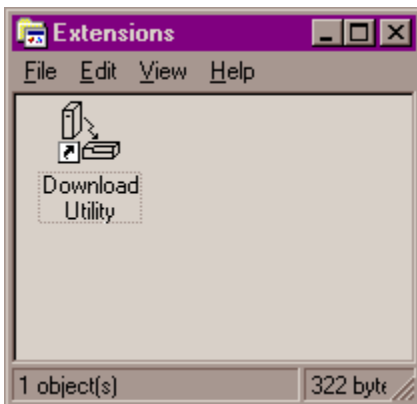


The assay configuration files will be installed from a floppy diskette in drive a: (other floppy drive designators may be available at this screen). It is recommended that the assay configuration files be loaded from a floppy drive.



The Download Utility files are being loaded. In most cases, there is only one Download Utility disk.

When the installation of the Utility is complete, an ICON similar to the icon below will be seen in Windows 3.1 or Windows '95. Remove the Download Utility diskette from the computer's floppy drive.

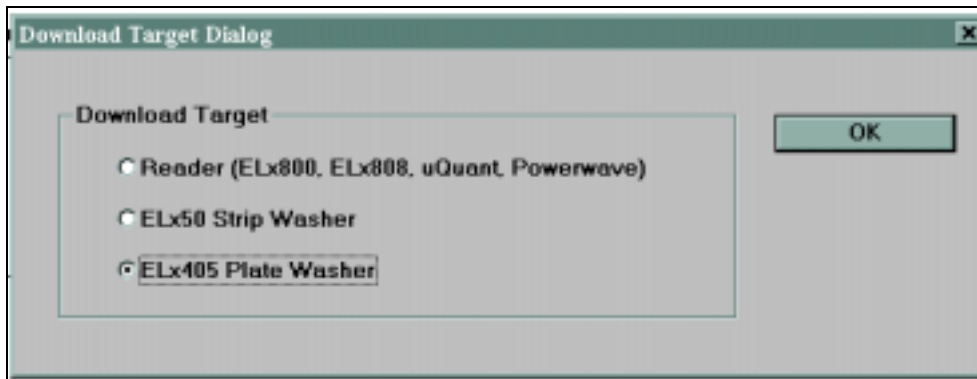


- 4.3. Insert the appropriate CONFIGURATION diskette into the floppy drive.
- 4.4. If the instrument display reads "ASSAY DOWNLOAD" (Readers) or "READY FOR DOWNLOAD" (Washers), double click on the Download Utility icon. If the instrument is at the main menu, press the Shift and Hidden Key #2 simultaneously (Hidden Key #2 is between the 'Main Menu' and 'Previous Screen' keys.). The instrument should display :

START ASSAY DOWNLOAD?	YES	NO	(Readers)
START PROGRAM DOWNLOAD?	YES	NO	(Washers)

Select "YES" on the instrument. The instrument will display as stated in 4.4. Click on the Download Utility icon. The floppy drive should become active while the

application is initializing. The following screen (or similar) should appear on the computer:

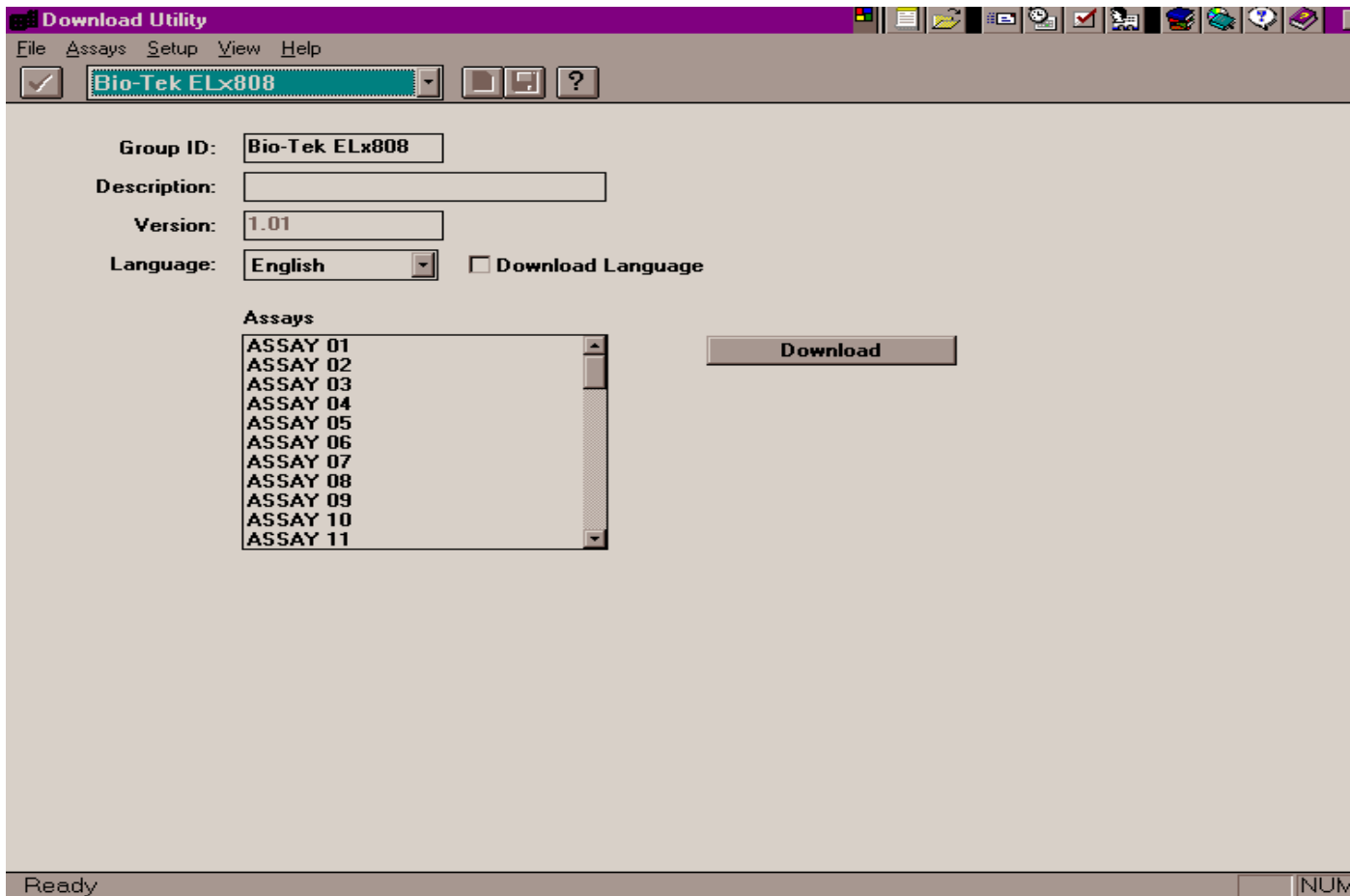


Select ELx800/808 Reader for : ELx800, ELx808, uQuant and PowerWave Readers

Select ELx50 Washer for the ELx50.

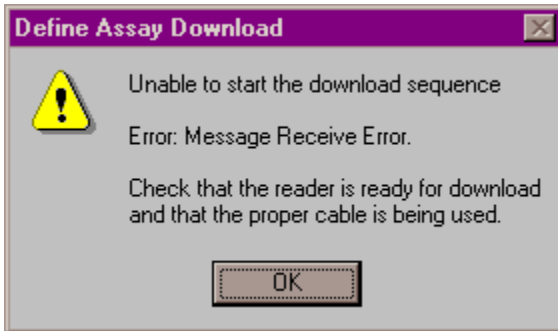
Select ELx405 Washer for the ELx405.

After Selecting, click OK. A screen similar to the one below should appear:



The Group ID will be either ELx800, ELx808, PowerWave, μ Quant, ELx405 or ELx50, depending on the Configuration software being installed. The names may vary as well, if the Configuration files have been customized by Bio-Tek.

Select the DOWNLOAD button. The Configuration download will begin. If the instrument and computer are not properly connected, or if the instrument display does not read "Start Assay Download", the following message window may appear:



- ✓ Check that the cable is connected between the computer and the SERIAL port of the instrument.
- ✓ It may be necessary to check/change the configuration of the serial port in the Download Utility (under Setup - Serial Port).

If the instrument does NOT display "Start Assay Download", press the Shift and Hidden Key #2 simultaneously (Hidden Key #2 is between the 'Main Menu' and 'Previous Screen' keys.). The instrument should display :

START ASSAY DOWNLOAD?	YES	NO	(Readers)
START PROGRAM DOWNLOAD?	YES	NO	(Washers)

Choose YES, then double click on the DOWNLOAD button in the Download Utility start the process again. After the configuration download is complete, the Instrument will re-initialize and return to the Main Menu. Check that the current software is loaded onto the instrument by pressing UTIL, TEST, CHKSUM. The instrument display will scroll through the seven digit part numbers and versions of both the Basecode and Configuration part numbers. Check them against the list at the end of this procedure. The software update is complete.

ELx50/16 Users

ELx50/16 software defaults to an 8 channel manifold configuration at download. When the download is complete, it is important to set up the instrument for the appropriate manifold. Press UTIL, then SETUP, then MANFLD and select the desired manifold.

IMPORTANT!!!

To check your Instrument's NEW software configuration, from the instrument's Main Menu, press UTIL, then TESTS, then CHKSUM. Record the information below and **fax this portion** to BTI Technical Assistance Center at **802-655-3399**, so that we may update your instrument records. If you are updating more than one instrument, please make note of all serial numbers of updated instruments.

I have successfully updated my Bio-Tek Autoreader/Autowasher,

Model _____

S/N:_____.

The new software installed is : _____ Version _____
Code Checksum: _____ ()
_____ Version _____

Company name_____ Signature _____ Date_____

B. Loading Assay Configuration Files Only.

1. Connect the instrument serial port to the computer COM port, using the 75053 null modem cable. *(If your computer has a 25-pin COM port, it will be necessary to attach a 9-pin to 25-pin adapter to the computer end of the cable)*
2. Turn computer and instrument ON.
- 2.1. On the instrument, press the Shift and Hidden Key #2 simultaneously. (Hidden key #2 is between the 'Main Menu' and 'Previous Screen' keys).

The instrument display should read "START ASSAY DOWNLOAD?"

YES

NO (Readers)

START PROGRAM DOWNLOAD?

YES

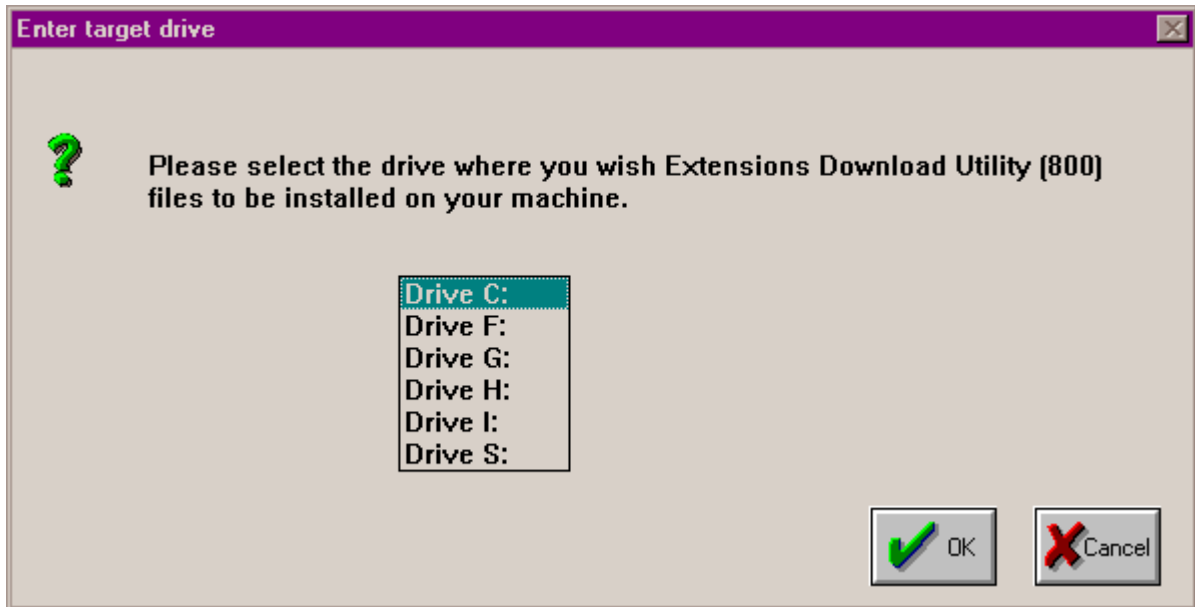
NO (Washers)

Select 'Yes'. The instrument will now wait for the download.

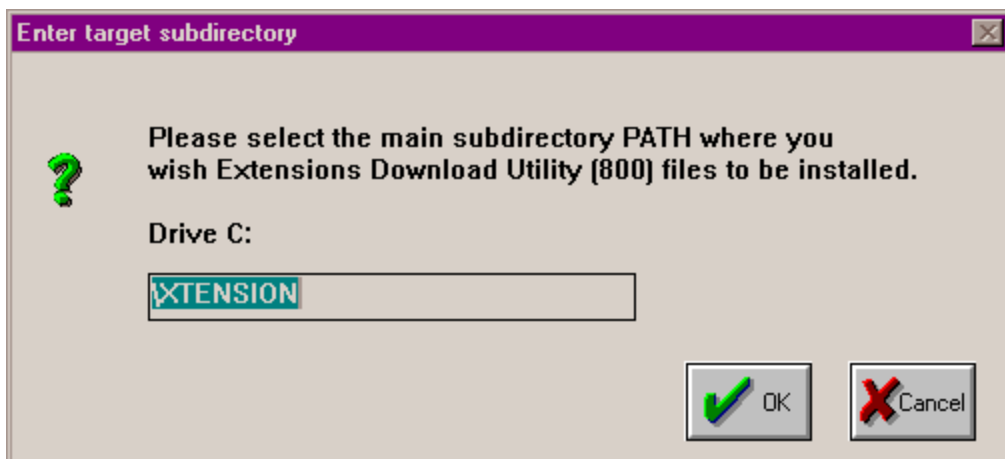
3. The download is performed using the Download Utility Program, part number 8290206-FW. Start Windows 3.1 or Windows '95 on the computer.

Note: If the Download Utility is already installed on your computer, go to step 3.3

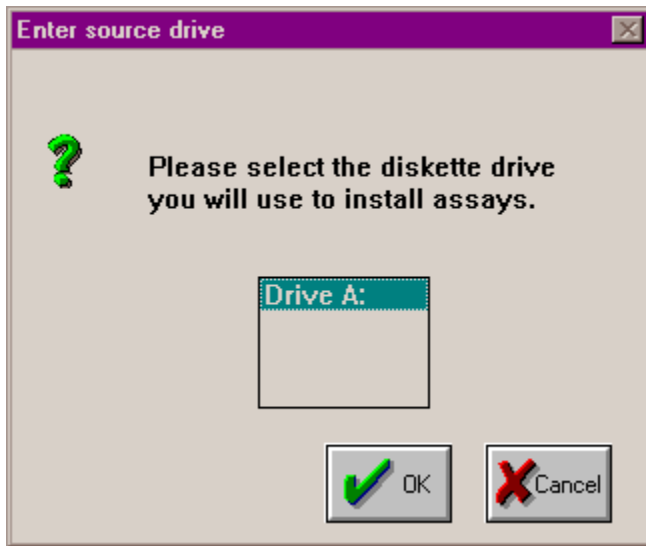
- 3.1. Install the Download Utility via the File Manager or Windows Explore. (Double click on the Download Utility's **Winstall.exe** file)
- 3.2. The install program will ask several questions - it is highly recommended that the user accept all the default settings in the installation process. Once the Winstall.exe is begun, you will see screens similar to those shown below:



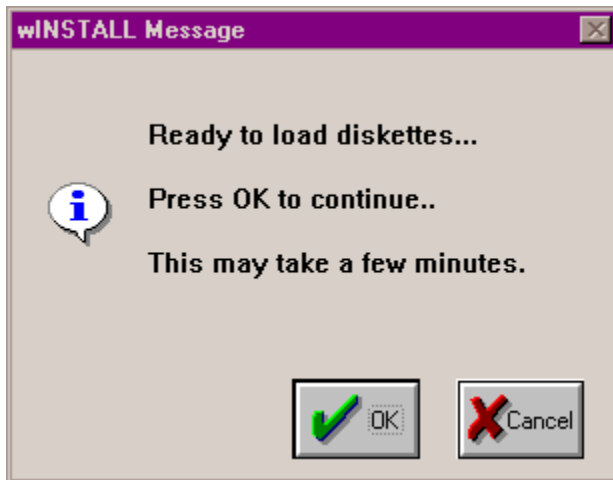
Select C: to install the Download Utility onto hard drive C:



The Download Utility will be installed in subdirectory C:\XTENSION, unless a different subdirectory name is entered.

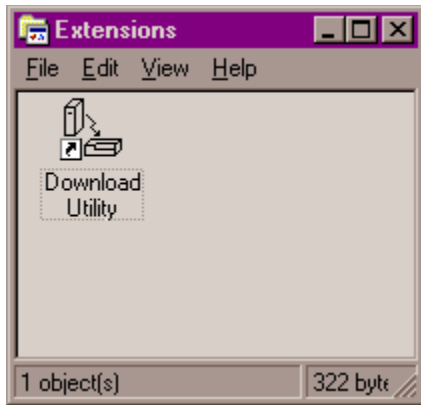


The configuration files will be installed from a floppy diskette in drive a: (other floppy drive designators may be available at this screen). It is recommended that the configuration files be loaded from a floppy drive.



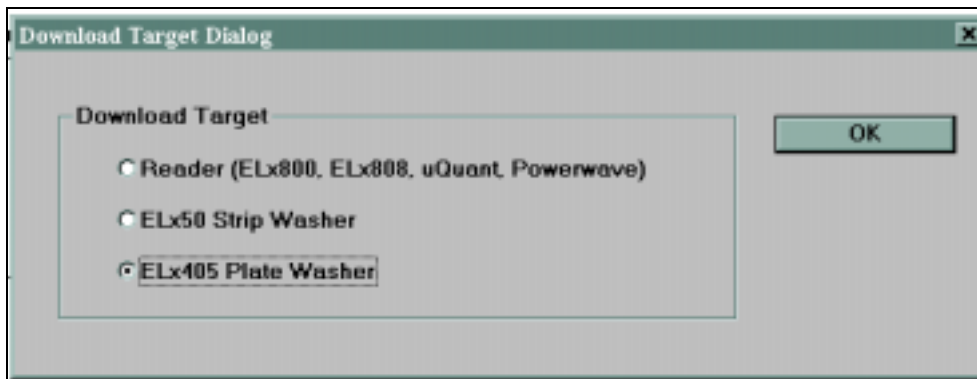
The Download Utility files are being loaded. In most cases, there is only one Download Utility disk.

When the installation of the Utility is complete, an ICON similar to the icon below will be seen in Windows 3.1 or Windows '95. Remove the Download Utility diskette from the computer's floppy drive



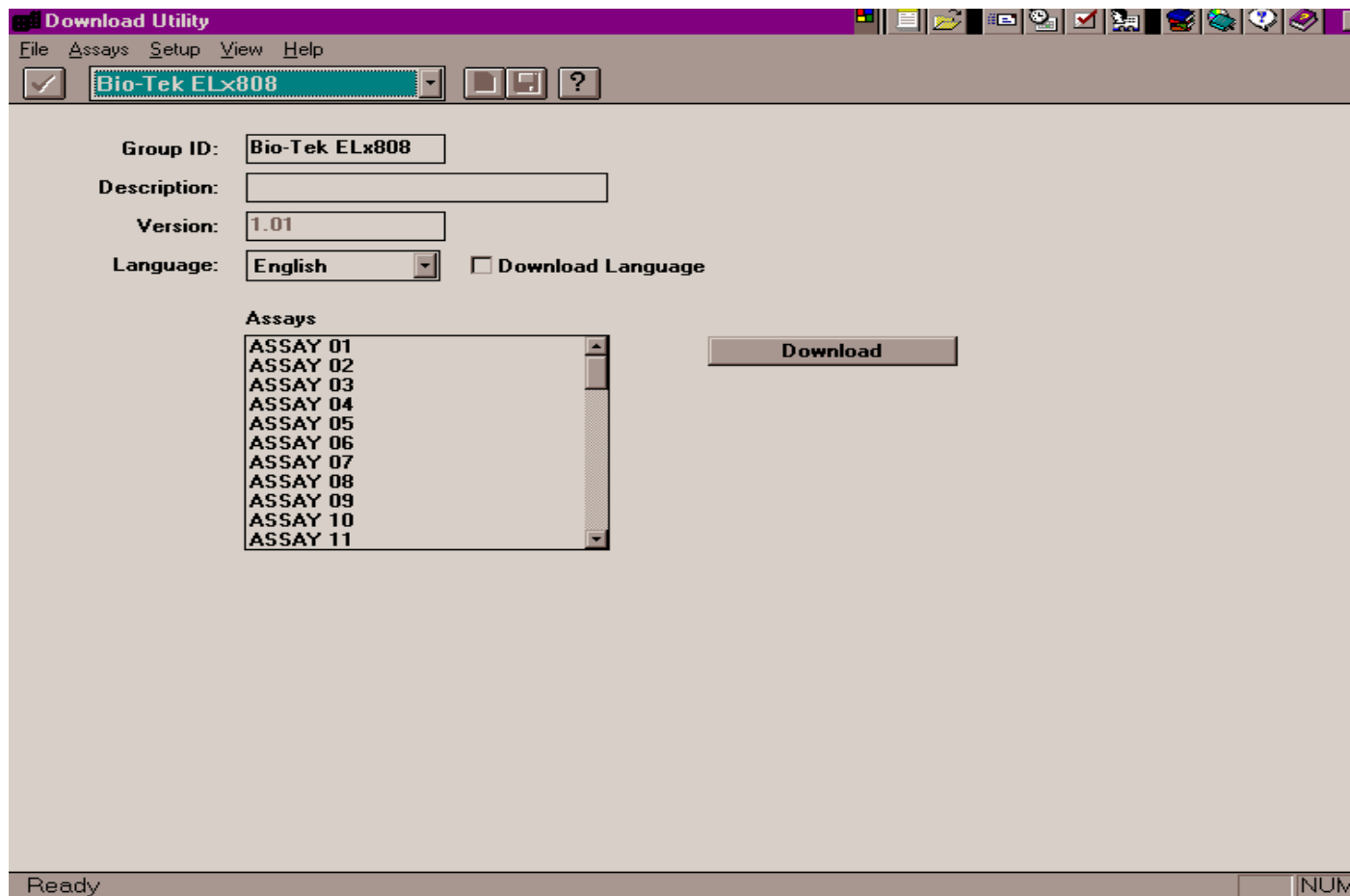
3.3. Insert the CONFIGURATION diskette into the floppy drive.

Double click on the Download Utility Icon. The floppy drive should become active while the application is initializing. The following screen (or similar) should appear on the computer:



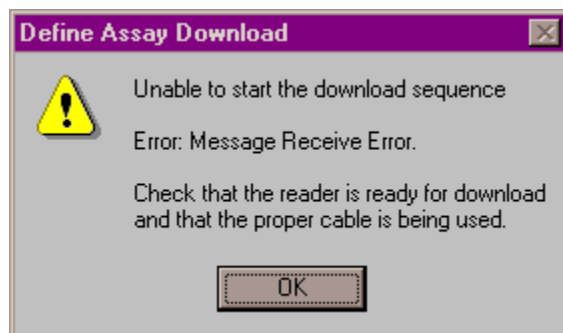
Select ELx800/808 Reader for : ELx800, ELx808, uQuant and PowerWave Readers
Select ELx50 Washer for the ELx50.
Select ELx405 Washer for the ELx405.

After Selecting, click OK. A screen similar to the one below will appear:



The Group ID will be either ELx800 or ELx808, PowerWave, μ Quant, ELx405 or ELx50. The names may vary as well, if the Configuration files have been customized by Bio-Tek.

Select the DOWNLOAD button. The Configuration download will begin. If the instrument and computer are not properly connected, or if the Instrument display does not read "Start Assay Download", the following message window may appear:



- ✓ Check that the cable is connected between the computer and the SERIAL port of the instrument.
- ✓ It may be necessary to check/change the configuration of the serial port in the Download Utility (under Setup - Serial Port).

If the instrument does NOT display "Start Assay Download", press the Shift and Hidden Key #2 simultaneously (Hidden Key #2 is between the 'Main Menu' and 'Previous Screen' keys.). The instrument should display : START ASSAY DOWNLOAD?

YES NO (Reader)

START PROGRAM DOWNLOAD?

YES NO (Washer)

Choose YES, then double click on the DOWNLOAD button in the Download Utility start the process again. After the configuration download is complete, the instrument will re-initialize and return to the Main Menu. Check that the current software is loaded onto the instrument by pressing UTIL, TEST, CHKSUM. The instrument display will scroll through the seven digit part numbers and versions of both the Basecode and configuration part numbers. Check them against the list at the end of this procedure. The software update is complete.

IMPORTANT!!!

To check your instrument's NEW software configuration, from the instrument's Main Menu, press UTIL, then TESTS, then CHKSUM. Record the information below and **fax this portion** to BTI Technical Assistance Center at **802-655-3399**, so that we may update your instrument records. If you are updating more than one instrument, please make note all serial numbers of updated instruments.

I have successfully updated my Bio-Tek Autoreader/Autowasher,

Model _____

S/N: _____.

The new software installed is : _____ Version _____

Code Checksum: ()

_____ Version _____

Company name _____ Signature _____ Date _____
